THE

# SOUTHERN AGRICULTURIST.

AUGUST, 1836.

## PART I.

### ORIGINAL COMMUNICATIONS.

*An Address delivered from the Agricultural and Police Society of St. Andrew's, before the Agricultural Society of Edisto-Island, July* 1836*; by* Dr. THOMAS LEGARE.

*Mr. Editor*,—I herewith transmit you for publication in your Journal, the Address of Dr. Thomas Legare, Chairman of the Delegation from the Agricultural and Police Society of St. Andrew's Parish, before the Agricultural Society of Edisto-Island. The Resolutions accompanying the Address, will explain the reasons, why Dr. Legare has consented to furnish his remarks for publication.

Respectfully,
JOHN JENKINS,
*Secretary of the Agricultural Society of Edisto-Island.*

*Resolved*, That the members of this Society do most cordially participate in the views of their Agricultural Brethren of St. Andrews; welcome with pleasure the gentlemen appointed to represent them at this meeting, and respectfully invite their co-operation.

*Resolved*, That we have been highly gratified with the eloquent and appropriate Address delivered on the occasion, by the Chairman of the Delegation, Dr. Legare; and the Corresponding Secretary of this Society is requested to obtain a copy of the same for publication.

The Agricultural Society of Edisto-Island having extended an invitation to the Agricultural and Police Socie-

ty of St. Andrew's Parish, to visit them by delegates, the latter Society accepted the invitation, and accordingly, appointed Dr. Thomas Legare, and Messrs. Godber and Geraudeau, to represent them. The arrival of these gentlemen having been announced to the Society, a Committee was appointed to wait upon them, and to request their acceptance of a dinner to be given at their house of meeting. The delegation having honoured the Society with their attendance, were received by the President with hearty congratulations, upon which, Dr. Legare, Chairman of the Delegation from St. Andrew's, rose and addressed the meeting as follows:—

**Mr. President and Gentlemen!**

Appointed as one of a delegation from the St. Andrew's Agricultural Society, to the St. John's Colleton Agricultural Society; and as the organ of that delegation, I offer you our congratulations, upon the prosperous condition of your community.

You have for some years past unquestionably taken the lead in the cultivation of one of the most valuable staples of our country; and it is to inquire into the causes, which have led to this unrivaled success, that has given rise to this mission from our youthful, but ambitious Society.

Before so enlightened a body as this, I surely need not enlarge upon the advantages to be derived from an interchange of social intercourse with foreign communities. Savages possess, and practice upon the rude elements of agriculture; but it is only in nations, whose commerce has brought from the remote portions of the earth, the contributions of each peculiar soil with well arranged accounts of their habits and character, that agriculture has attained any respectable footing; and all the departments of thought, as well as the manners and customs of society, derive unquestionable advantages from the competition, that is elicited by an enlarged and enlightened intercourse with mankind.

Hide not your light under a bushel is an injunction of holy origin; and seems to be peculiarly applicable to our community in the present critical state of our common country.

The slave question is assuming at the North and in Congress, a portentous aspect. The bold sectional and

unstatesmanlike language of Mr. Adams, in relation to Texas, warns us of the holy Northern alliance that is forming against the integrity of our interest; and seems to call for a more close and fraternal union among ourselves.

From the very nature of our government, it seems almost impossible to bring about a unity of feeling and of purpose among our citizens; since its central tendency sweeps away all private and sectional feelings, in the irresistible flood of executive patronage; which at this time is made to accommodate itself to Northern policy.

We have for some time past been endeavouring to relieve ourselves from Northern thraldom in every department of education. Literature, medicine and law, have long since been found to be attainable within the precincts of our own native state; and thank God, religion (from whose mistaken zeal) I apprehended the most serious consequences, is now threatening to sever that bond of brotherly love, which has hitherto (on their part) so hypocritically allied materials of a heterogeneous and repulsive character; but agriculture, poor agriculture, the very back bone and muscle of the country; from which all the wealth of commerce and the revenue of the government is derived, is not only doomed to be clogged and trammeled by legislative enactments, and by the bigoted spirit of the age; but it is her fate to be neglected by the fostering hands of those, to whose comforts she has so largely contributed.

It is a disgrace to the State of South-Carolina, that amidst her unparalleled enterprize, no efficient step is yet taken, to carry out the enlightened and patriotic suggestions, of one of your most distinguished citizens in behalf of an Agricultural Professorship.

Why should not our sons be educated like gentlemen in the vocation of their fathers? There is not a more honourable calling under heaven, than that of the planter; and not a more fatal obstacle to the progressive improvement of society, than the idea, that Practice is and of right ought to be, independent of Science.

Where would the agriculturist of Europe and America now be, were it not for the analysis of the Chemist; and to whom is the world so largely indebted for the common comforts of life in all the departments of domestic husbandry, as to the illustrious Sir Humphrey Davy.

By this neglect on our part to elevate the standard of agricultural education, we have been silently contributing to lower the dignity of our noble and truly scientific profession. Indeed, it has been very happily observed, that our whole business is a series of illustrations of the principles of Science; and our very plantations, but scientific laboratories.

Without the habits of generalization, which a systematic education can alone impart, the observations and experience of the most judicious individual, must be vague and indefinite, but partially profitable to himself, and totally useless to posterity.

'Tis true, gentlemen, you have each and all of you contributed your quota towards establishing that *esprit de corps*, so creditable to the agricultural rank of your native island; but I must say, without meaning any odious comparison, that the contributions to the written agriculture of the State, forms a large portion of the debt, which the South owes to the untiring literary labours of one distinguished individual.

The triumphs of his pen have contributed largely to do away with that ancient, but barbarous prejudice against what has been sneeringly called by the vulgar, book planting.

What darkness and obscurity as to the improvement of the present, would the next generation of your community be left in, were they alone dependent upon the labours of your most allowedly successful, but mere practical planter. His light radiates over but a small and selfish circle.

It goes for the aggrandizement of the individual and his own immediate family; but leaves the coming generation of myriads unborn, to commence *de novo* with the same rude and elementary principles which guided the primitive labours of their forefathers; and thus would society be deprived of the accumulated contributions of each successive generation, to the great stock of human knowledge and human happiness.

Let us, for instance, contemplate the superior intelligence which lights up the pathway of modern philosophy, over the useless and visionary speculations, which occupied and exhausted the labours of the ancient scholiast, in the primitive and poetic ages of the world; and from this elevated platform of human achievement, the

mind will involuntarily look forward through the long vista of futurity, with the proud anticipation of still brighter attainments.

The Almighty has no where said to the human mind, thus far shalt thou go in the attainment of perfectability, but no farther; sufficient and proportioned unto the day, is the intelligence thereof.

Man is born to a higher destiny than the brute that lives but for to-day and moulders into dust, inspired with no aspirations after immortality, and leaving no monument to future generations of its industry and enterprize. Not the creature of an age, but of eternity; he is placed upon this earth, to develope gradually and progressively, (according to the wants and necessities of society) all the great principles of Science; which after all is but a record of the common laws of nature; and having accomplished the great end of his vocation in this tabernacle of clay; not even death being able to arrest his onward career, his nature will throw off mortality and put on immortality with all its corresponding enlargement of knowledge.

Thus is feeble man with his now confined powers of locomotion; and his blind speculations of judgment, transformed and elevated by the progressive improvement of his intellect, into a nature infinitely enlarged in its capacity for knowledge and happiness.

From this elevated pinnacle of glory, he will be called upon to make still higher advancement, in the great scale of creative existence, through a progressive and never ending series; and thus as time rolls on, through the sublime periods of eternity, will the humble atom, which now gropes in doubt and darkness, be qualified to live amidst the radiant light of God's own countenance.

With this high and elevated destiny before each and all of us; he must not only be insensible to the posthumous glory which awaits a good name; but he must be brutally indifferent to the sublime anticipations which animate the soul, that has clothed itself on earth in the mantle of charity; who could fail to be inspired with the pious hope of leaving the impress of a benevolent character upon his day and generation.

In you, who are so largely indebted to your predecessors, will it be peculiarly ungrateful to toil selfishly for your own immediate generation; and leave no written

legacy to the agriculture of posterity. Yes! Gentlemen, you are much, very much indebted to the generation that is fast passing away for carrying out the triumphant experiment of industry and enterprize, which regales the eye in every quarter of this favourite Isle.

To their indefatigable exertions, is to be attributed the unrivaled prosperity of their sons; but these lights are fast burning out; and you will shortly have no more than the memory of their deeds, to cheer you on through the vicissitudes of life.

Already has one patriarch* just left the busy scenes of life, and been gathered to his fathers. Others, there are, 'tis true, who like the sturdy oaks of our forest, still bloom with a fresh and vigorous verdure, in the winter of their days; and still bless society with the inspiring influence of their precepts and example. It is with painful and melancholy feelings, Gentlemen, that I invite your sympathy for the disabled and enfeebled condition of one of your most venerable and enterprizing citizens,† cut off prematurely by indisposition from his wonted usefulness.

I hope that I will not be considered as trespassing upon the sacred precints of private feelings and of private griefs; when I attempt to pay a humble tribute to the character of one, whose general beneficence has placed his reputation in the keeping of the public. It is, therefore, not only a pleasure I feel, but a duty which impels me to give honour, where honour is due.

The southern community in general, as well as the domestic circle of many a now flourishing Edistonian, will long remember the enlarged and untiring efforts of this public spirited individual, to shake off the lethargy which has so long and so recently enshrouded the com-

* The late Wiliam Edings, sen.—*Ed.*

† This just and feeling allusion is to William Seabrook, sen., of Edisto Island—a gentleman, whose life has been characterized by an industry and skill, which has long made his home distinguished, as one of hospitality and elegance. It is with feelings of severe regret, that we are constrained to state, that the health of this venerable and public spirited citizen, has been for some time back been precarious. A loss like his will be felt not only in the immediate community of which he has been so beloved a member; but over the entire State whose agricultural and commercial interests he has done so much to advance. His course in life, has been honourable and useful; and whenever it pleases Providence to end it, his memory shall be cherished by the pleasing recollections of his virtues.—*Ed.*

mercial, agricultural and mechanical interests of this section of the Union; and in your little Isle, every department of labour, will bear ample testimony to his industry and his liberality.

May he go down to his rest like the setting sun, whose light is not suddenly put out; but gradually softened and mellowed by the evening shade; and thus may the light of his virtues long continue to shed their moral influence upon the young and rising generation.

The aged are often permitted to linger amongst us on the confines of life, (long after their activity have flown them) as moral land-marks to society. Let us all like him endeavour to live a life of activity and usefulness; and having promoted the comfort and happiness of our species, we will have the consolation of our own consciences to soothe us through the path of disease and suffering; and when we come to die, our deeds will live after us, in the grateful recollections of a grateful people.

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## *On the Pisé Work.*

*Mr. Editor*,—Having introduced me to the public, in one of your late numbers, as being the originator of Pisé work in South-Carolina; and having been solicited by you, to give to your readers, some account of this mode of building, I have been induced to offer you the following.

Pise, or rammed clay buildings, are of very ancient invention; and in one shape or other, have been used in almost all parts of the world. In England, Ireland, France, Italy, and other countries, writers have given accounts, of the existence of buildings of this description, which have been built centuries ago: and a late writer in your journal, has spoken of the many splendid edifices of Pisé, which are to be found near the city of Lyons. There can be no doubt, therefore, that Pisé buildings, as to their fitness for commodious and elegant habitations, have already received the successful test of experience.

A little more than forty years ago, the idea suggested itself to me that such buildings might, with great convenience, and at little expense, be introduced amongst us. I was determined to make the attempt; and accordingly

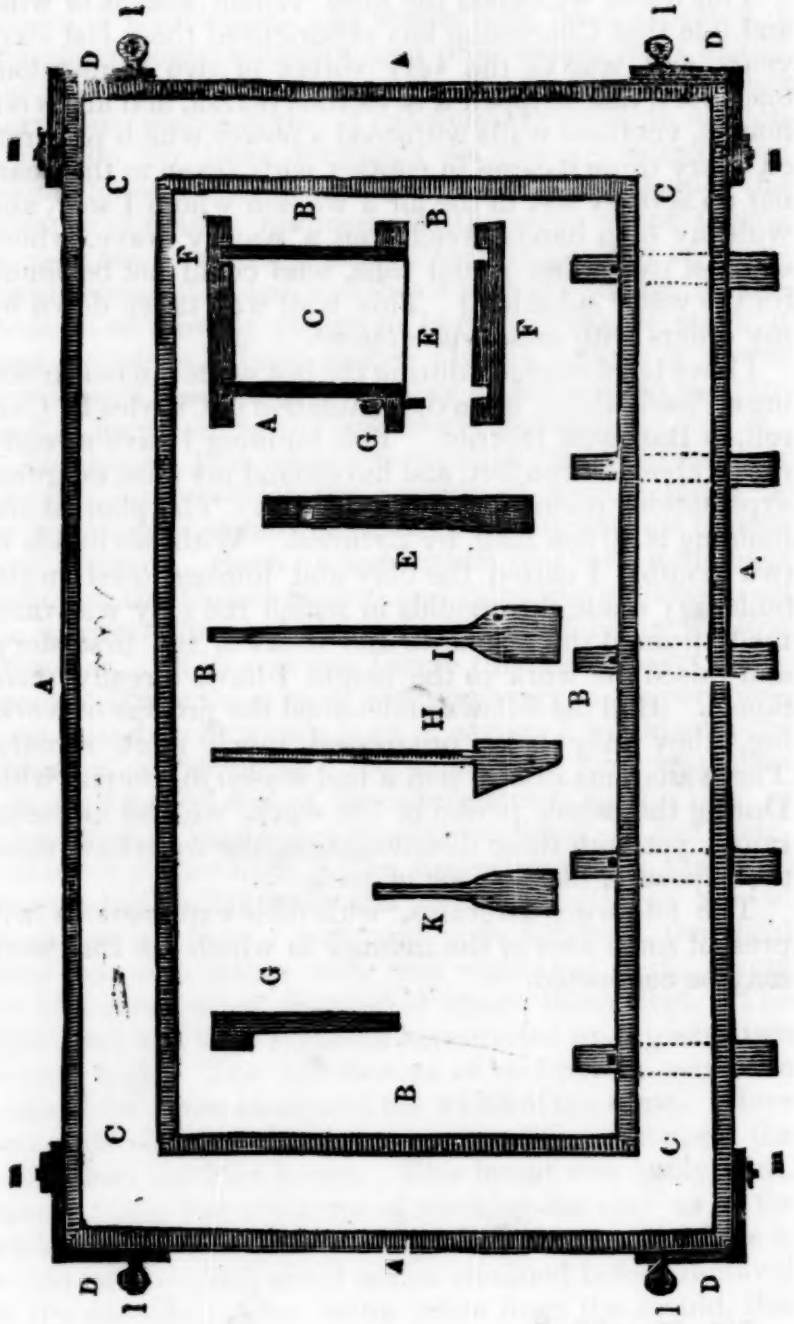
commenced operations upon several of these kinds of houses in Charleston. As was to have been expected, I committed some blunders, as I progressed; but I finally succeeded in finishing six very good houses, three of which were three stories high. I calculate the strength of such a wall on Sir Isaac Newton's doctrine of motion, the "*visinertia* of matter." Such a house having double the quantity of matter rammed into the same space that a brick house contains, it follows that its quantity of inertness becomes doubled, and that it requires double the momentum or moving power to blow it down, or move it from its place. Inert matter always acts as a power downwards, and the impossibility of its escaping in a tangent, is increased by the intensity of the matter.

And hence, Pisé walls are peculiarly fitted (from their sluggish inertness) for the erection of manufactories, or for foundations of rail-roads, on which tremulous machinery revolves. Such an application will save millions of dollars to the United States, and countless millions to all the world. To this I claim the credit of being the first suggester. Of its success, I have the most perfect confidence. If any thing more was necessary to support positions raised on Newton's laws of nature, I would add, the history of a Pisé house I had built about forty-two years ago, at the west end of Boundary-street, in the City of Charleston. This house was 32 feet long, 16 feet wide, and three stories high. The first story of the Pisé wall was twelve inches wide and ten feet high, the second story was ten inches wide and nine feet high, the third story was nine inches wide and eight feet high, giving an elevation when finished of about thirty feet. The south end and west side was surrounded by a piazza two stories high. The interbraces of this piazza were the joists of the house elongated the width of the same. Here you will observe the intimate connexion between the piazza and the Pisé house. This house was badly built, having fallen into the error of working the clay as if for bricks, and in that state putting it into the mould where it would not dry, and could not be rammed before removal of the moulds. After being taken from the mould, this (while in a ductile state) was effected, though imperfectly, which produced not a very straight wall. I am thus particular in describing this house, to give a correct idea of the strength of such walls.

This house withstood the most violent storms of wind and tide that Charleston has experienced these last sixty years, and was in the very vortex of two tremendous tornadoes, that stripped it of its roof, piazza, and all its out houses, yet these walls withstood a power which prostrated every thing it came in contact with, (even to the bearing up seventy feet in the air a woman whom I saw, and with my own hands saved from a watery grave, where she lost two of her grand sons, who could not be found till the water subsided.) This wall was taken down by my orders with *considerable labour.*

I have been engaged during the last winter in constructing a Pisé building upon the plantation of Charles R. Carroll, in Barnwell District. This building I have already raised about eleven feet, and have found my most sanguine expectations realized as to its success. The plan of the building is 50 feet long, by 25 broad. With two hands in two months, I carted the clay and lumber used in the building; made the moulds in which the clay was rammed, framed the windows and doors of the first story, and raised the work to the height I have already mentioned. Had the fellows understood the process of working, they may have progressed much more rapidly. The walls thus raised, had a bad season to contend with. During the whole period of the work, we had incessant rains; yet with these disadvantages, the walls have stood the exposure, like a piece of rock.

The following diagrams, with their explanations will present some idea of the manner in which the Pisé work may be conducted.


A
B
C
D
E
F
G
H
I
K

The parallel black lines of the diagram A. A. A. A. represent mould-boards, 25 feet long, by 16 inches wide. These are to be formed of boards, three quarters of an inch thick, and should be nailed or screwed together, one longitudinally, the other transversely; so as to form a thickness of one inch and a half. The boards should be well seasoned and smoothly plained.

The two inner lines B, B, indicate the inside mould-board, formed in the same manner as A, A.—C, C, C, C, the wall or foundation, on which the wall clamps, marked E, are laid flat, for the reception of the mould-boards A and B, on their edges. *(See diagram G.)*

D, D, corner clamps or hinges of iron—one end to be passed over a bolt and fastened with a linch-pin or key; the other end to be screwed into a female screw in the mould-board.

E, Wall clamps laid upon the foundation or wall, as each section is progressed with. These clamps have a shoulder one and a half inch high at one end; from which the clamp tapers to the other end, at which there is a mortice as indicated in the diagram. In this mortice the pin G is put to support the weight of the mould-boards on their edges.

F, F. Caps or mean braces to put on the mould-boards A and B as they are raised on the wall clamps E.

G, the pin with a shoulder to rest on the wall clamp E.

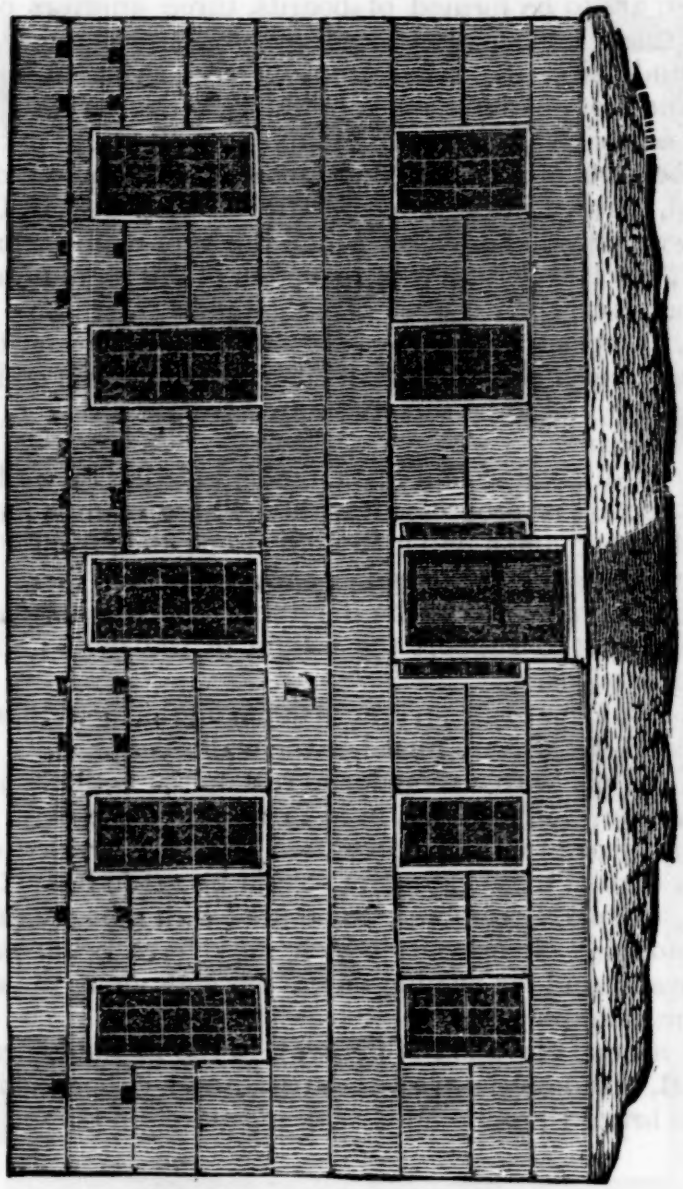
H, a beveled rammer, used in ramming the clay.

I, a square rammer, to be used after the beveled rammer; both of these rammers should be made heavy.

K, a caulking rammer, to be used with a heavy mallet for stopping all crevices which may have occurred on the wall; and for beating down the clay along the sides of the mould.

C, an end elevation of the wall in the mould-boards A and B, fixed on the wall clamps E, and capped with a mean brace F, and pinned with a square pin G.

L, a front side elevation of the Pisé wall or rammed clay house, as it appears when taken from the mould.



*Directions for Working the Pisé.*

Preparatory to commencing the Pisé work, the clay to be used in it, should be hauled and piled in heaps around where the building is to be erected. Before running it into the mould, it should be well mixed, so that all lumps may be broken up.

In order that the workers might not be detained in good weather, I would particularly recommend, that all the frame work for the house, such as joists, doors, and window frames, be ready at hand, as wanted.

As each story is carried up, it is best to fill up all little crevices, which might occur in the wall; and any irregularity on the surface of the wall should be smoothed down with a trowel and indurating plaster, such as I will describe. Your moulds being erected as per diagram, and your clay well mixed and pulverized, it is then to be thrown into your mould, about six inches thick. The pisedore or rammer must carefully level it; and proceed to ram, with the rammers, in the order already mentioned, until the Pisé has become too hard to receive any farther impression. In this manner, the pisedore proceeds until he has reached the top of the mould. This being done, the mould is removed by striking out the pins G out of the wall clamps E, and by also removing the caps F. This may be done in a few minutes, and the mould set for the next section, which must be proceeded with precisely as the first.

The window and door frames must be erected inside the mould and well stayed. For the bevel of the window jams, a board must be dropped the depth of the mould, with such a slope as may be required. When the wall is worked up to the window caps, a piece of 3 by 4 scantling may be continued all around the house, next the window caps. The lintels are then to be put on, so as to fill up flush with the mould. The wall may now be continued as before, until the joists are to be laid. Some difficulty will arise here, owing to the joists intercepting the mould-board. To remedy this, however, a section of about ten feet of mould may be substituted, the inner side of which must be jogged so as to fit down close over the joists as they are laid. After this course, the mould-boards must be worked as before.

If it is intended to have a piazza round the house, you may project the joists in such a manner as to do away the necessity of afterwards placing them around the house. At the top the same may be done, so as to have the house and its piazza covered by the same roof. In all cases it will be best to project the roof over the walls, twelve or fourteen inches, in order that they may be protected by a bold eve-drop.

Between clay and lime, there is little, if any sympathy. They will seldom stick together; hence, it becomes necessary to look to other means, than the usual lime plastering for a coating to the Pisé work. Fortunately, there are materials all around us, combining all the advantages of cheapness, beauty and durability.

The following indurators, will be found to answer all the purposes of the best plastering which could be applied to a wall.

I. Take linseed oil, rub into it litharge, red lead, or sugar of lead; and with a paint brush rub it over the wall. The composition will immediately sink into the same; and convert it into a coat of hard putty, impervious to water and every kind of weather. Two or three coats are sufficient. The oil may be applied without the litharge, &c. though it will be found far better with them.

II. An indurator for out-houses and coarse buildings.

Take turpentine gum; boil it in strong salt and water, until so thin, that it will come off the brush freely. Lay it hot on the wall with a brush, and in dry weather it will soon form a crust impervious to water.

III. Another cheap indurator.

Take tar, mix it as the turpentine gum, in strong salt and water, and while warm lay it on the wall with a brush.

IV. An indurator fit for inside work. Take molasses, mix with it an equal portion of strong salt and water, put a little red lead into it, (to give a body,) and rub it on the wall with a brush. This indurator is almost equal to linseed oil.

V. An inside grout or indurating plaster. Lay six or seven boards, lengthways, on level ground, inclose them with boards around the edge, so as to form a kind of tray. Throw in 30 bushels of good clay, 20 bushels of fine fresh water gravel, into these put as mush fresh water, as will attenuate it to the consistency of gruel. In this mixture put three or four pounds of saw-gin cotton, 3 gallons of molasses, and six pounds of red lead. Agitate the whole together, and a fine plaster may be had, which will receieve the most beautiful polish, and any kind of paint. This plaster should be put on with a trowel.

VI. Another indurator for inside work. Dilute thick rice gruel, with whiskey or alcohol, and lay the mixture

on the wall with a brush. It will soon harden and afford a beautiful polish.

In making you this communication, Mr. Editor, I claim nothing of originality, save the construction of the moulds, tools, &c. for carrying on the Pisé work; together with the receipts for making indurators for the walls. Though I believe I was the first to introduce Pisé buildings into this State; the art is nevertheless of the most ancient origin. Historians say, that the walls of Babylon, were made of these materials, and I have already shown how ancient the art has been in Europe. With the hopes that this communication may serve you, and the information which it contains, be useful to my fellow-citizens.

I subscribe myself,
BARTHOLOMEW CARROLL.

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### *On Over Planting.*

*Mr. Editor,*—This is the right sort of season to prove to persons the great folly of over planting. The vast quantity of rain that has fallen, has caused the grass to take a start which enables it to run so far ahead of the workers, that it is with the greatest difficulty that they can overtake it. Where the agriculturist has planted largely to the hand, I defy him to keep the grass under. He may use skimmer-ploughs and hoes, and every thing else; but the grass will grow, and by the time he gets through the second field, the first will be as bad as ever. Now Mr. Editor, where a moderate number of acres have been given to the hands, they may defy grass—they may stir their land oftener—expose it to the operation of the sun—lead off the water by keeping open their drains, and in every other respect, attend their crops with greater nicety and ultimate profit. Corn, cotton, potatoes, and in fact, every other portion of your crop will be better managed. If you will so, it may be better manured, and by having less to do, it may be more frequently forced, should the season prove backward. I speak, Mr. Editor, from experience, when I write thus. This season I was induced to plant largely to the hand. I wished, like the greedy dog, to catch a double quantum of meat at once; the consequence is, I have almost lost all. Some of my neighbours warned me, that such would be the case; and I conceive that

I have realized the truth of their warning. While I have been overrun with grass, and had my workers pushed from morning to night; they have kept clean fields, and have had time enough to stir their land well, to opening their drains, and to attend to other concerns. Need I tell you that they are far ahead of me; and in every respect have fair crops. I write you this communication, Mr. Editor, that others might profit by an experience for which I have paid somewhat a high price. If I have paid dear, however, for my *whistle*, I shall not be so selfish as not to let the experienced hear its *sounds*.

With earnest solicitations for yourself, and great interest for the highly useful work which you conduct.

I remain, Mr. Editor, your obd't. serv't.

TOOGOODOO.

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*On the Crops.*

From every portion of the country, we have received the most unpromising descriptions of the crops. Every one complains, that he has had too much rain, and in some instances, hundreds of acres have been irrecoverably lost. Several correspondents have informed us, that in the middle districts not more than half a crop can possibly be made; and this too, only in the event of our having a late and propitious season.

Having taken a short agricultural excursion into the country, we shall state, for the benefit of our readers, the appearances of such crops as we have met with. Our excursion has been in a great measure confined to the sea-islands, and the main lands in the vicinity.

The cotton crops upon the main, are generally backward; and in their growth very irregular. The lands of this portion of country, not being so thickly inhabited or generally cultivated, there are consequently, fewer means of draining them effectually. From contrary causes, the island lands are better drained, and being more indented with creeks and the land more absorbent and of a lighter nature, the falls of rain are more easily led off. This is the season to convince the planter of the vast utility of draining. Wherever we have observed good drains, we have observed the salutary effects in the growth of the cotton.

Our correspondent Toogoodoo, has very correctly mentioned one of the causes of the backwardness of our main-

crops, in his complaint against over planting. We fully concur with him.

*The cotton crops* of the islands, though very backward, are, generally speaking, not a great deal worse than during the last season. High manuring, early planting, and unremitting attention, have enabled the islanders to contend in a great measure with the adversity of the season, and to have the promise of fair crops in the long run. As a consolatory hope, one of the most skilled planters amongst them, observed to us, that many years experience have taught him, that a backward spring is generally succeeded by a proportionately forcing summer. Indeed, this is the observation of botanists in all ages of the world: and Providence in its care seems to have ordained, that such should be the case. We sincerely trust, that the coming season, will realize our most sanguine hopes in this particular.

*The corn crops*, wherever we have visited them, promise well. In some very low situations, where the water has been prevented from running off, the corn has become scorched, and is beginning to drop its leaves. We think, however, that fair crops may be expected, as most of the early corn is now out of danger. Every attention should now be paid to corn planted late. It should be well hauled and kept entirely free from the least particle of grass, and every thing should be done to force its growth. To accomplish this purpose, we have seen some persons placing manure around the young plants and hauling upon it.

*The potato crops*, are better than could have been expected. On high lands they are said to be excellent. Most persons have finished planting their slips, which owing to the frequent rains have taken well. A few sweet potatoes have been sold in market; but they will probably continue a scarce article until next month.

*The rice crops.*—Of these we have only seen one or two fields. We are informed, however, that they have stood the season much better than was to have been expected. Where the freshets have not broken the dams, it is thought that fine crops will be made. For the inland swamp planters, the season is as fine a one as could have been had.—*Editor.*

### *The Nut Grass.*

*Mr. Editor*,—A writer under the signature of "Blue House," has, in your February number, given some directions concerning the management of nut grass, which I have pursued, and found, in part, beneficial. He has, however, committed a capital error in recommending large beds in the first instance. The reverse of this, is the proper course. The beds when made small and flat, will admit of successive *haulings*, which alone, are found to be efficient. The grass when hoed, will in a couple of days appear again, with renovated strength. But its being *buried alive*, is what it cannot stand. It is a savage mode of warfare, which it does not appear to recognize among the usages of honourable war. But an enemy whom no treaty can bind, but who is the determined foe of human intercourse, has no right to claim the civilities of human intervention. I would bury him, Mr. Editor. It is the only sure way of getting rid of him.

A friend of mine the other day, called my attention to his mode of treating this scourge, the effects of which, were most obvious. A piece of ground which he had lying fallow, and which was much infested with this grass, he had thickly *blanketed* over with pine-trash. He told me he had tried every thing, and in all had failed to destroy this grass; until, at length, he had nearly determined to abandon his plantation. Just about this time, he heard of the wonderful cures made by the Steam Doctors, and he at once conceived the idea of steaming his enemy; he accordingly had a portion of this nut grass patch, covered with pine-trash to the thickness of six inches, any thing shorter will not cause the perspiration to flow fast enough; and believe me, Sir, when I saw the portion of ground alluded to, which was four months after the operation, I did not see a spear of grass, whilst the portion adjoining, was literally covered with it.

Is "Blue House" in earnest, when he expresses the belief that hogs will destroy the grass? If he is, tell him, my neighbours will be at the trouble of driving their hogs to his assistance, if he will but say so.

Yours,

JAMES ISLAND.

## *On Keeping Agricultural Books.*

Oak Grove, Jasper City, (Geo.) June 29, 1836.

*Dear Sir,*—Inclosed you will receive five dollars* in payment for the present volume of the *Southern Agriculturist;* and while writing, I will take this occasion to state, that I am much pleased to discover from the numbers I have received of your valuable publication, that it is well sustained; for (to me) it is passing strange, that nine out of ten of the cultivators of the soil throughout our country, that take a paper at all, support the political press alone. I am clearly of the opinion, that every man ought to be informed as to what is going on in his country; and that he can only do, by reading. Still as a *farmer*, if he takes but one publication, that surely ought to be on agriculture; but the great misfortune is, that our people think they have nothing to learn as to the management of their farms; whereas, the fact is, we, as a people, are at this time in the cradle, as to the great business of agriculture. Still, I hope, we are on the eve of a revolution in this matter.

On the 12th of March last, I had the misfortune of having my dwelling house consumed by fire. We lost our entire library, and I feel the loss of several volumes of that valuable work, the American Farmer, together with a number of volumes, (so to speak) of what I term a "Farming Memorandum," that is a book that I have been in the habit of keeping for several years back. I commence on the first day of the year, and make as near as I can, a complete schedule of the entire value of every species of property on the farm, commencing with the value of the land, then the negroes, passing entirely through, putting a value on every thing. I then, at the close of every week make an entry of the kind of work that has been done; I also note the seasons, the time of planting each kind of crop from year to year.

I think that I have been well paid for the time taken up in this way. At the close of the year, after keeping an exact account of the entire sales of the crop, as well as all the expenses of every kind, (noting minutely the smallest matters,) I am then prepared to see what interest I make on the value of my estate, and whether it be much,

* Intelligence of this kind is always valuable,

or whether it be little. Every farmer ought to know what he is doing, and it appears to me, that he can only know (certainly) on the above plan.

In addition to the above book, keep what I term a stock-book, in which is entered the value of all the stock on the farm, with such suggestions as their management may seem to require; it is only necessary for once to get in a habit of making those entries, and it will become easy, and the time will never be felt only in the way of improvement.

Before bringing my letter to a close, I would ask of some of your patrons to your excellent work, as to the best plan of managing the grape vine, whether the vine should regularly be kept pruned or trimmed through the summer, or whether they should be suffered to remain with all their sprouts and leaves on them, the above inquiries, together with the mode of making wine. All this matter written out in a plain manner, would be very thankfully received.

Should you deem any or all of the above worthy a place in your excellent periodical, you are at liberty to use it as you think proper.

With great respect, &c.

ALEXANDER M'DONALD.

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### *Answer to the Queries of* P.

June 25, 1836.

*Mr. Editor*,—In answer to your correspondent P, in your valuable journal for June last, requesting information how the *Camellia Joponica* can be best cultivated in our Southern climate; I shall mention the mode of cultivation which I have found the most successful, and if your correspondent P will adopt it, I have no hesitation in saying, that he will be highly gratified with the result. The Camellia being what gardeners call a peat plant, that is, it prefers a low boggy situation, it is in such a soil well drained, that I have found them to grow better than in any other; in all the gardens of your city, but more particularly where the land is made by filling up the low grounds, they will flourish finely. They can, however, be cultivated advantageously in high lands, if a hole five or six feet diameter, and three deep, is dug and the bottom covered five or six inches deep with clay, and then

filled with the rich vegetable earth from a pond or swamp, only in very dry and hot weather, they will require a little water once a week. It is necessary to shade them from the first of May, until the end of September, as the tender shoots are liable to scorch, the gloss of the leaves appearing to concentrate the suns rays with the power of a lens, burning them into holes, and very much injuring their beauty. It is also necessary in hard freezing weather to protect the plants in blossom, for although they are very hardy, so much so, as to withstand the very severe cold of the winter before the last, uninjured in the wood-buds and leaves, yet the blossoms and flower-buds are destroyed entirely by being frozen; losing their colour and dropping without progressing any farther. A very ornamental shade may be made for summer by making an arbor sufficiently large to protect the plants from the direct rays of the sun, and high enough for a free circulation of air, and to allow of the morning and evening sun reaching them, by planting and training only on the top, any of the numerous climbing flowering plants that ornament our gardens.

I have found during ten years cultivation of Camelias, that they are little liable to disease, or to be attacked by insects, that their cultivation was very easy, and from their blossoming during the fall, winter and spring months, the beauty of the plant, and the profusion of the flowers, (for I have had from three to four hundred on a small plant) I beg leave to recommend them to every votary of Flora.

J. ENLIM.

P. S. If your correspondent Calomel will allow his hogs and poultry to range under his fruit trees, he will not longer complain of their being gummy and falling from the tree half grown. The hogs will devour the fruit as it falls with the worms in it, the poultry will destroy the little beetle which causes the fruit to rot, and Calomel must, himself, pick out the worms which he will find in his trees near the surface of the earth. Ours is truly a fruit country, but it is really astonishing how little good fruit is to be seen; had our climate been less favoured, our own exertions would have been greater. A great change for the better has, however, taken place within a few years, and I flatter myself, Mr. Editor, that we shall soon

see our markets supplied with abundance of all the finest kinds of fruit which our bountiful climate requires so little exertion or skill, to bring to a degree of perfection not known in less favoured regions.

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### *Bee Hive.*

Spring Garden, Columbus, (Geo.) July 5, 1836.

*Sir*,—Inclosed you will receive for my subscription to your *Southern Agriculturist*, for 1835 and 1836, ten dollars.*

I have made a Bee-hive after the plan laid down in No. 11, of the 8th volume of your work, page 607, and put two very large swarms in it in March. The young colonists are doing very well, and I am pleased with the hive, as it is a great saving of bees, there being no necessity of killing them while robbing their honey. I intend, however, improving on this plan, by putting in *draws* instead of boxes, as the honey will be then more easily taken from them by pulling *out* the draws horizontally, than by the present mode of lifting up the boxes.

If you can throw any light upon another mode of raising bees, that is, in a house shelved like a store, and the bees working in these open shelves, I should be pleased to read an essay on this mode in one of your future numbers. I have learned that there are, one or two such houses, within the range of your very useful work, and should thank some subscriber to give a detailed account of the manner in which it is built, and the rearing of the bees in it.

Yours, respectfully,
THOMAS G. GORDON.

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### *Queries.*

*Mr. Editor*,—Being a mere tyro in the things relating to the Science of Agriculture, and being desirous of profiting as much as possible by the experience of others, I shall emulate the laudable example set by Edisto-Island, of propounding questions through the medium of your highly instructive journal. The correctness of the theory advanced by D'Candolle, "that the superfluous or noxious particles contained in the sap, on its return from the

* Why cannot we receive more communications of this kind.—*Editor.*

leaves, are excreted by the roots," having been fully substantiated by the experiments of M. Macaire; we are furnished with a rational explanation of the deterioration of land subjected to successive crops of the same plant. To attempt to raise the same plant in a soil thus deteriorated, has been very aptly compared to an attempt to feed an animal upon his own excrements. The same distinguished physiologist proved also, that the particles which were excreted as noxious by one family of plants, were highly nutritious to another. Upon this well established fact is based the system of a rotation of crops. Now for my Queries:

Can this excrementitious matter be removed by any other means than by a rotation of crops? Your correspondent "Beaufort," says, "We know that by a rotation of manures we may reasonably dispense with a rotation of crops." What constitutes the rotation of manures here alluded to? What is their *modus agendi?* It appears to me, at present, almost impossible that any rotation of manures can so neutralize the excrementitious matter, as to supersede even measurably a rotation of crops. By replying to these questions in a full and plain manner, Beaufort will confer a favour on

ROUND O.

What crop is best calculated to remove the excrementitious deposit made by cotton?

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## *On the Cultivation of Land.*

Near Edgefield Court House, (S. C.) July 20, 1836.

*Mr. Editor,*—There are so many inquiries by planters and farmers, through the medium of your periodical, as well as other publications on the subject of agriculture, that my remarks as a small planter may not satisfy these inquiries, not having the means to carry into effect my views to the extent I could wish—still, as far as my experience has extended, I am willing to impart it to my planting brethren.

In the cultivation of land, the soil must be considered to the adaptation of what is to be planted in it, for nature has pointed out to us, that soil as well as climate is intended for certain productions, and if we go contrary to this undeviating principle, it would only discover our folly—

still, in certain climates different productions may succeed in the same soil, but not to that extent adapted to them. To succeed in planting, requires the most assiduous attention of those who are engaged in it. It will not do to trust to others, except under the immediate inspection of the proprietor, for no one can feel the same interest he does himself in a pecuniary point of view, nor can that necessary knowledge be attained without his personal attention.

The precise mode of culture one year may not answer that of another, but must be varied to suit the seasons, and the implements of husbandry applied accordingly. It would be extremely injudicious, when the earth is highly saturated with moisture to till it in the same manner as when it is under the influence of drought, and it would be equally inconsistent to treat it in drought in the manner it ought to be done when moist. But this has frequently been the practice, ruinous to the crop, under the impression, that work must be done wet or dry. It is certainly most advisable, to under than to over plant, and manure as much as our resources will admit. But alas! where are these resources! The lands have been so worn out from long and over culture, and the country so thickly settled, that no range can be afforded for the rearing of stock, and our forests have disappeared, leaving hardly timber enough for fencing and fuel, and in many instances, not enough for this purpose; consequently, very little advantage can be derived from cattle and leaves for them to tread, the only dependence for manure in this section of country. One of the reasons why, the West and South-West countries produce so much more to the hand than we do, is owing to our employing too large an operative force to our worn out lands. It would be better to divert the supernumerary force to other objects, and employ less capital in it, and only cultivate such lands as would make more return for the labour bestowed on them.

If these hasty reflections should be worthy of publication, I will on a future occasion give you the mode and result of my management the present year, having deviated in some measure from my common practice, relying more on the plough than the use of the hoe, as has been the case heretofore.

Yours, respectfully,

A PRACTICAL PLANTER.

# PART II.

## SELECTIONS.

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### *Review of Mitscherlich's Compendium of Chemistry, with remarks on the method of teaching Chemistry; by* JAMES C. BOOTH.

[FROM THE JOURNAL OF THE FRANKLIN INSTITUTE.]

AMONG the votaries of any science, a lively interest is naturally felt in the publication of works connected with that science; a feeling greatly enhanced by the circumstance of their proceeding from men of high reputation. This is more particularly the case with chemistry, which is daily increasing under the hands of its followers, by the accumulation of new and important facts, and by the proposal of new theories to account for the phenomena. Numerous works in this science, of greater or less comparative value, are yearly brought before the tribunal of public opinion, and yet there are but few which do not either wholly fail of success, or which have more than a limited circulation. The cause of this is not so much an ignorance of theory on the part of the author, as the want of sufficient practical knowledge to enable him to put much of his theory to the test. As chemistry is a science of facts, so it cannot be learned without seeing them, nor taught without being able to exhibit them; hence it is that he who has experimented himself, is better able to describe the results of his operations, than he who describes phenomena of which he has only heard or read; for the former gives the more striking impression, which the experiment made on him, the latter the impression as derived from a description. Another cause operates to render the great majority of works in this, as in other sciences, unsuccessful; they are destitute of uniformity of execution. Too few authors, in commencing a work, are themselves aware of their object, or if they be aware of it, pursue it with that uniform and steady aim which is absolutely necessary to its complete success; hence many otherwise excellent treatises are rejected for this reason alone, while others of inferior merit, but exhibiting uniformity of purpose, rise above and even supersede them. "Whoever would please every one, pleases no one," does not loose its force by repetition, for there is no single work on chemistry suited to every class of readers or of students, nor can it indeed be anticipated in a science embracing such an infinite number of facts, and such a variety of objects. What interest does the minor, or the smelter of metals take in organic chemistry? Of how little real utility to the pharmaceutist or manufacturing chemist

are discussions relative to the subtle theories of the science? Is it necessary for the purely theoretic chemist to be acquainted with all the details of the manufacturer? How little has the student, when commencing, to do with all these? Lastly, where is the chemist who can embrace them all with the same energy as when devoted to one only? Therefore, I contend for unity of purpose, and uniformity of execution, and I think the answers to the foregoing questions will be found conclusive.

A work on chemistry has lately appeared to which the name of its author alone would ensure success, though not perfectly free from the faults I have above endeavoured to point out; for notwithstanding these, it possesses merits of a peculiar kind, entitling it to consideration. Whoever would call over the names of chemists of celebrity, of the present day, and omit in his catalogue that of Professor Mitscherlich, of Berlin, the founder of the doctrine of isomorphism, would do great injustice to him and to the school to which he belongs. For although this doctrine be not fully developed, it has nevertheless been resorted to with success, for correcting former errors, and strengthening certain theories, and promises te become an important agent in disclosing the hidden operations of nature. All that we have hitherto known of Mitscherlich are a few treatises, through the medium of their French translations, and we are now introduced to him as the author of a "Manuel of Chemistry." I propose giving a sketch of the subjects contained in the first part of the first volume, (for the whole has not yet appeared) and would wish to draw the attention of the reader at the close, to a few remarks on an important subject, viz. *the method of instruction to be pursued, in communicating the facts of chemistry to the uninitiated.*

The work commences without preface or introduction, the first page containing an enumeration of the elements with which we are acquainted, and the second thus unceremoniously introducing oxygen to our notice: "If red oxide of mercury be heated in a retort, the neck of which passes through a cork in one opening of a receiver, then through a tube fitted in another opening, bubbles of air will pass and displace the water contained in an inverted cylinder." This is accompanied by a wood cut representing the apparatus, and a detailed description of the entire operation. A few deductions are then drawn from the experiment, viz. that there is a metallic body liquid at common temperatures; that there is a gaseous body differing in its properties from common air, this being shown by transferring a part of the gas into a smaller vessel, and holding a cinder of wood in it—that these two are held together by a certain power, which is termed affinity, and similar conclusions, such as a reflecting student might be supposed to make for himself. The same experiment is then supposed to be arranged in such a manner, that the resulting metal and gas may be weighed, from which the conclusion is drawn, that the red oxide is composed of certain quantities of the two substances alone, so combined that their individual properties cannot be detected, and in this simple manner the first clear views of the effects of affinity are communicated.

The method of preparing oxygen for practical purposes, from the black oxide of manganese, is next minutely described, together with the iron retort and gas holder employed in the operation. A large number of experiments are exhibited by Professor Mitscherlich before his class, which are not detailed in the work, his object in doing so

being the desire of keeping this first element before the student as long as possible, until the latter shall have fully made its acquaintance by a knowledge of its properties, thus proceeding upon the well established principle, that the mind lays hold of an entirely new subject by slow degrees.

The powers of combination possessed by oxygen are now mentioned, and its compounds with manganese adduced as examples of the union of one body with different proportions of another, as if to break the ground for the reception of the difficult truths relative to combining proportions, and the section is concluded by a numeral representation of the five oxides of manganese, and the three of lead.

The whole is illustrated by eleven wood cuts, representing the apparatus, with the mode of employing it.

I have dwelt more particularly on this first section, that it may serve as a specimen of the remainder, and as I wish to recur to it at the close for the elucidation of a few points, of which I intend to treat.

Hydrogen, and its combination with oxygen, are next introduced, and an experiment arranged to show the composition of water, from which the student obtains an idea of the theory of volumes, and a clearer view of the atomic constitution of bodies.

Nitrogen, and its combinations with oxygen and hydrogen, are mentioned, but not specially treated of, as the former will be found, according to the arrangement adopted by Berzelius, among the acids, the latter with the alkalies.

The peculiar properties of sulphur are now described, and as one of them, its power of crystalizing in certain forms, from which naturally flow observations on the regular forms of bodies. The solid, liquid, and vaporous states are exemplified in the body before us, and the section closes with the method of obtaining and purifying it in the large way.

Selenium and phosphorus are slightly noticed, only the combinations of the latter with sulphur and hydrogen being given. Mitscherlich advances the theory that the difference between the two kinds of phosphuretted hydrogen lies merely in a small quantity of phosphorus dissolved by the self-inflammable variety, adducing as an argument the fact that hydrogen in contact with phosphorus for a length of time, takes up a small quantity, causing it to phosphoresce when exposed to the air. According to Rose's analysis, they are chemically the same, and they may be converted into each other by means which we have not as yet wholly in our power. But Mitscherlich's theory does explain how the non-inflammable is sometimes converted into the inflammable variety. It appears to me probable, that the non-inflammable phosphuretted hydrogen is a definite compound, in which the two substances are combined with such force, as not to inflame under common circumstances, but that certain causes operate to decompose it, forming another compound of hydrogen and phosphorus, by which a portion of phosphorus precipitates and is dissolved by the new compound, rendering it phosphorescent by the state of minute division of the phosphorus. The union of oxygen in the air with the dissolved phosphorus produces heat, and this in sufficient quantity, inflames the whole. By the reverse action, the dissolved phosphorus is again taken up into chemical union, and forms the non-inflammable variety, and I think that this is the only way in which we can explain the

re-conversion of one into the other, and their identity as given by analysis.

Chlorine, with its combinations with nitrogen, sulphur, and phosphorus, bromine, iodine and fluorine, follow in succession. An easy method, unattended by danger, of preparing iodide of nitrogen is described, which shows the composition of this class of bodies. A small quantity of nitro-hydrochloric acid is introduced into a test-tube, and a few particles of iodine digested in it at a gentle heat. A part of the oxygen of the nitric combines with hydrogen of the hydro-chloric acid, while the liberated chlorine unites with iodine, forming a brown solution. If ammonia be added to this solution, the chlorine of the chloride of iodine unites with the hydrogen of the ammonia, while the iodide of nitrogen precipitates as a dark brown powder. It is filtered, and the paper, while wet, torn into small pieces and dried.

The diffusive nature of the remarks on phosphuretted hydrogen, while the sulphuretted is passed over in silence, is excused upon the plea, that "the latter belongs more properly to the acids." I think, however, this gas might have been exhibited to keep up in the student's mind the chain necessary to a clear comprehension of the subject.

A too strict adherence to the rule of describing "all the non-acid metalloidal compounds in that place," brings our author into difficulty, for the introduction of many of them is premature, as regards a majority of those for whom the work was intended, that is, for beginners; and accordingly, after describing cyanogen, we have a full account of the combinations of oxygen, hydrogen and carbon, followed by a description of fifteen compounds of hydrogen and carbon, and these again by the combinations of chlorine, bromine and iodine, with the preceding. The author, as if aware of having committed an error, says, "I have considered it proper to mention a large number of compounds in this place, and enough in relation to each of them to excite some degree of interest," and offering as an apology that the "reader will soon discover that a continued examination of these substances is of the highest importance, inasmuch as it may be the means of enriching the science with many interesting facts." But he does not stop here, for after very properly describing the sulphuret of carbon, we are introduced to certain compounds of oxygen, hydrogen, nitrogen and carbon, viz. to the amids, which close the long section on carbon. There are eighty-four pages devoted to carbon and its compounds, and only seventy-nine to all previous substances, a circumstance so out of character with the whole tenor of the work, and to the principles which originated it, that we feel ourselves led to inquire into the reason of this deviation. I offer the following very simple solution; first, that this subject, in all its bearings, is at the present moment in the hands of the most distinguished chemists, necessarily giving birth to important facts, which ought to be communicated to the scientific world as soon as possible; and second, that Mitscherlich, with his wonted ability, has himself investigated many of the above compounds, and has deviated from the principles on which the work was commenced, from a desire to make known his discoveries. That this was actually the case, I do not assert. but such are the conclusions to be drawn from a review of the Manual.

A description of borium and silicium closes the first general division of the work, viz. the metalloids and their non-acid mutual combinations.

The remainder of the first part of the first volume is occupied by, first, the general properties of air and the gases, and second, those of water, and collaterally of solid, liquid and æriform bodies. To gain a just idea of the plan of the whole, it will be necessary to enter a little into detail. The author observes, when introducing the subject, "it appears to me to be more conducive to my end as it certainly would be more intelligible, to bring together in this place what is more general in its nature, and what has been often repeated in the foregoing, after a series of experiments have been instituted, and many phenomena exhibited." I may, however, observe, that the arrangement is not altogether original with Professor Mitscherlich, it being merely a modification of, perhaps an improvement on, the plan adopted by Berzelius in his large work on chemistry. While the former has neither preface nor introduction, the latter precedes his system by a somewhat cursory notice of light, heat and affinity, and a rather long article on electricity and electro-magnetism. Berzelius follows the metalloids by the general properties of gases and liquids, which subject is considerably expanded by Professor Mitscherlich, as will be seen presently.

A description of the air-pump, followed by the mode of determining the specific gravity of gases, naturally leads to an account of the pressure of the air and its measurer, the barometer. Mariotte's law of compression, and that of expansion are properly here introduced, and we now prepared to determine the composition of the air by means of hydrogen.

The mixture of gases, and the circulation of oxygen precede an important subject, namely, the examination of substances composed of oxygen, hydrogen and carbon.

I propose hereafter to give a translation of the article on the ultimate analysis of organic substances, which, however, I must remark, I think, is rather out of place, in the commencement of a work adapted to instruction.

Flame, the distillation of wood and coal, lamps and furnaces, are next minutely described, and close the general properties of air and the gases. A little reflection will, I think, show us that the greater part of the subject is much more intelligible now, than it could have been previous to the exhibition of the metalloids and their compounds, and though, perhaps, some of the preceding and following articles might have been omitted with propriety, yet I contend for the superiority of the plan in an elementary work, of first introducing substances, and then the laws by which they are governed in their various actions and relations.

The properties of ice, the specific gravity of solids and liquids, and their relations to heat, are succeeded by a subject on which much of their atomic theory depends, viz. the determination of the specific gravity of vapours; in order to ascertain whether the relation between the specific gravity of the solid and its atomic weight is the same as that between the vapour of that body and its atomic constitution. From the experiments of Mitscherlich and of Dumas, it would seem that from the specific gravity of the solid, we cannot draw conclusionsas to that of the vapour; hence that we cannot say if a certain weight of carbon unite with a certain weight of sulphur, then so much of the vapour of carbon will unite with so much of the vapour of sulphur. But the difficulties attending such researches are too great to allow us to receive the results with implicit faith, and it is therefore

advisable to await the confirming experiments of others in this most important of all subjects connected with the atomic theory.

The pressure of vapours, and by an easy transition, the theory of the steam-engine, are next treated of, and the remainder of the volume is occupied by the general relations of solids to solids, of liquids to liquids, and of these to gases, under which we find capillary attraction; solution, with an interesting table to be seen in Professor Beck's work on Chemistry; precipitation; filtration; edulcoration; the antiseptic properties of charcoal; condensation of gases by solids and liquids; many of which subjects are treated of in an original manner by Mitscherlich, and it may be advisable to offer them at some future time, in order not to lengthen this essay too much. I now close the analysis of this first part of Mitscherlich's work, and proceed with the inquiry started at the commencement of these remarks.

A close and careful examination of the section on oxygen brings us to a very important conclusion as to the manner in which the science of chemistry may and ought to be taught. That there is at present a deficiency in regard to our elementary instruction in chemistry, every teacher is well aware, and hence in selecting a work for his classes, he chooses "that which is least exceptionable," thus plainly indicating the difficulty with which he has to contend; but so universally is nearly the same plan adopted, that almost every one arrives sooner or later, at the conclusion that "a student, when commencing, should have some previous knowledge of the subject." Now we are not to suppose our readers totally ignorant of numbers, nor destitute of a general elementary education, but we must suppose them ignorant of the peculiar nature of solids, liquids and gases, that there are invisible bodies around us whose properties render them tangible, that all the bodies seen in nature are composed of a few elements. We ought to suppose that they cannot properly distinguish between the metals, earths, or alkalies, and even that they have no definite idea of what a metal is; and yet, aware of this, how few give a course on chemistry, without preceding it by a long series on heat, light and affinity. In describing the conducting powers of solids, can the student fully understand the subject, when many solids are mentioned, which are quite unknown to him? Can he under like circumstances, fully comprehend the doctrine of the capacity for heat, the pressure of vapours, solution, distillation and the like? What does he know of the bodies quoted to illustrate these general laws, and without which they cannot be understood? Much less is he prepared to encounter the theory of flame, the construction of lamps and furnaces, subjects of great importance to every one, though they are necessarily lost, because the terms used in description, the essential terms have not been defined. But the most unaccountable of all seems to be the developement at the commencement of a chemical elementary work, of the laws governing the combinations of bodies both by atoms and volumes. In the tables of elective affinity, what does the student know of sulphuric acid, of baryta, strontia, soda, &c. or of a salt, when he is ignorant of its constituents? He no doubt conceives one body to be pulling others with different degrees of force, but it is next to impossible he should have more definite ideas on the subject than this; and yet a reference to our chemical works will show that these doctrines are introduced, and being theoretic, the reasons for and against the theory are usually brought forward and illustrated by a multitude of examples. Experiments are at the same time instituted

by way of proof; but I ask, does not this savour of the mystery of the adepts in alchemy, to exhibit a striking effect, and withhold the cause; for what difference is there between withholding the cause altogether, and explaining it in language known to be unintelligible?

But to proceed farther, can a student master the subtle doctrines of affinity, when those more advanced experience some difficulty in reasoning upon them? For example, the first law of Dalton, that "the composition of bodies is fixed and invariable, must be illustrated by a number of well selected facts. Suppose we take sulphuric acid, which is generally brought forward for this purpose. It is an acid; what notion does the beginner form of an acid? When exhibited to him, he conceives it to be something like an oil, which will corrode animal and vegetable matter. To show its bearing on the above law, he is informed that it is always composed (a novel idea to him) of 16 parts by weight, of sulphur. and 40 of oxygen, and that the sulphuric acid formed by the hand of nature ages ago, and that made artificially at the present day, have precisely the same qualities. With what a multitude of new ideas is he here overwhelmed, that there is an invisible substance, which may be weighed out and made to mingle with a solid, so as to form an acid, in which we cannot detect one of the individual properties of the constituents. It were useless to give more instances, for every one must be struck with the impossibility of rendering a definition intelligible, where the defining terms are not understood. and with the inconsistency of teaching according to this method, while at the same time the instructors must be aware that all their efforts cannot be crowned with success. The remarks made on the first law of combination will apply to the two remaining laws, although the difficulties are increased ten-fold, and I would beg the attention of instructors to this subject; nay, more than this, as our science requires us to "question nature and she will answer us," so I would propose the same principle in this case. Let those interested in the inquiry, experiment for themselves; let them strike out a course founded upon the principle, that "a beginner is wholly unacquainted with the subject," and let them closely observe its effects upon the student, for in this, as well as in other kinds of knowledge, a reflecting and inquiring student often leads us to observations which might otherwise have wholly escaped us, and which may induce important results.

The system adopted by Berzelius, and founded on this principle, was eagerly seized by others, and advantageously extended by Mitscherlich in his Compendium, the commenment of which, the section on oxygen, and a few succeeding, were conceived and executed in a masterly style. He first exhibits an experiment, a fact, and then makes such deductions as naturally flow from it, making the student acquainted with names in connexion with facts. The constant mention of a great number of names, heard for the first time, and without knowing the properties of the substances named, only tends to create a confusion in the minds at the threshold of the science. in the very place where the utmost clearness and precision are requisite. Again, observation teaches us, and it is a received opinion, that we acquire ideas of things before abstract ideas, before we can reason on those things. This is a strong argument in support of my position, but is too generally acknowledged to require amplification.

The whole of Professor Mitscherlich's Compendium is not conceived with the same energy, and only shows the difficulty of writing

with a manifold object in view. For instance, a majority of the compounds described under the article carbon, might have been advantageously deferred to a future portion of the work; there existed no necessity for such diffuse remarks on the general properties of the solids, liquids, and gases, inasmuch as they break in upon the chain of elementary substances, turning the attention from the principal objects to those of minor importance, at least less so in the commencement. The article on organic analysis is wholly misplaced, and only intended for those much farther advanced in the science. The same might be said of many other portions of the work, which inevitably leads us to the conclusion, that it was written for different classes of hearers, and for different purposes. On this point, I refer to my remarks in the introduction to this paper, where I attempted to show, in a concise manner, that a work on chemistry should possess unity and uniformity of plan, object, and execution. Be this, as it may, the present volume of Mitscherlich's Compendium is a valuable addition to the chemist's library.

*Philadelphia, May*, 1836.

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## *Extracts on the Culture of the Vine; by the Author of the "Domestic Gardener's Manual."*

[FROM THE BRITISH FARMER'S MAGAZINE.]

It is a matter of surprise that wine-making has not been an object of general interest among agriculturists and persons of somewhat limited incomes, who possess a few acres of land. The climate of Britain is, it is true, changeable and moist, and the vine, to produce the richest and most saccharine fruit, courts a rather arid and sunny situation; but facts and experience prove that, although we cannot command the vintages of Portugal, nor those even of the South of France, we can assuredly procure grapes from, at least, four varieties of the vine, of very superior quality indeed.

But we do not require fine ripe grapes; unripe fruit,—nay, vine leaves alone, will make excellent wine; and the operation requires only a certain degree of knowledge and experience. I shall, in passing, allude to vines from such materials; but my primary object shall be to direct the reader's attention to a simple *Method of Growing the Vine*, so as to procure early ripe grapes; and from such grapes to prepare, sweet or dry, *perfect* wines for his table.

It may, to some, appear superfluous to refer to the notable example of English wine-making furnished by the honourable Charles Hamilton's "*Method of making Grape Wine*, fully equal to Champaigne and old Hock, from the fruit of his beautiful vineyard at Pain's-hill, in Surrey," but to others, a short quotation from the account written by that gentleman himself may prove agreeable and very interesting.

"The vineyard at Pain's-hill is situated on the South side of a gentle hill: *the soil being a gravelly sand.* It is planted entirely with two sorts of Burgundy grapes:—the *auvernat*, which is the most delicate and tender; and the miller's grape, originally so named from the powdery whiteness on the leaves in the spring, called in England—the *black cluster*, or Burgundy grape. The first year," Mr. Hamilton, says, "I attempted to make wine in the usual way, by treading the grapes; then letting them ferment in the vat till all the husks and im-

purities formed a thick crust at the top, the boiling ceased, and the clear wine was drawn off from the bottom. This essay did not answer; the wine was so harsh and austere that I despaired of ever making red wine fit to drink; but through that harshness I perceived a flavour something like that of small French wines, which made me hope that I should succeed better with white wine: that experiment succeeded far beyond my expectation.

"It would be endless to mention how many good judges of wine were deceived by my wine, and thought it superior to any champagne they ever drank. Even the Duke de Mirepoix preferred it to any other wine. But such is the prejudice of some people against any thing of English growth,* I generally found it most prudent not to declare where it grew till after they passed their verdict upon it. The surest proof I can give of its excellence is, that I have sold it to wine merchants for fifty guineas a hogshead, and one wine merchant, to whom I sold £500 worth at one time, assured me he sold some of the best of it from seven shillings and sixpence to ten shillings per bottle.

"After many years' experience, the best method I found of managing it was this,—I let the grapes hang till they had got all the maturity the season would give them; then they were carefully cut off with scissors, and brought home to the wine barn in small quantities, to prevent their breaking or pressing one another; then they were all picked off the stalks, and all the mouldering or green ones discarded, before they were committed to the press, where they were all pressed in a few hours after they were gathered. Much would run from them before the press squeezed them, from their own weight on one another. This running was as clear as water, and as sweet as syrup, and all of the first pressing and part of the second continued white; the other pressings grew reddish, and were not mixed with the best. As fast as the juice ran from the press into a large receiver, it was put into the hogsheads and closely bunged up. In a few hours one would hear the fermentation begin, which would soon burst the cask, if not guarded against by hooping them strongly with iron, and securing them in strong wooden frames, and the head with wedges. In the height of the fermentation I have frequently seen the wine oozing through the pores of the staves. These hogsheads were left all the winter in a cold barn to have the benefit of the frost. When the fermentation was over, which was easily discovered by the cessation of the noise and oozing; (but, to be more certain, the pegging the casks shewed when it would be quite clear:) then it was racked off into clean hogsheads and carried to the vaults, before any warmth of weather could raise a second fermentation. In March the hogsheads were examined. If they were not quite fine, they were fined down with common fish glue or isinglass, in the usual manner: those which were fine of themselves were not fined down. All were bottled about the end of March; and in about six weeks would be in perfect order for drinking, and would be in their prime for above one year: but the second year the flavour would abate, and would gradually decline till it lost all its flavour and sweetness. Some that I kept sixteen years became so like old hock, that it might pass for such to one who was not a perfect connoisseur. The only art I ever used to it was putting three pounds of white sugar candy to some of the hogsheads, when the wine was first tun-

* Is it not so in America too?—*Ed.*

ned from the press, in order to conform to a rage that prevailed to drink none but very sweet champagne."

The above extract, from a very useful and instructive compendium, entitled "*The Family Receipt Book*," contains the details of an experiment in the great way. It is given to prove what might be—what has been done. But I am not to recommend the manufacture of wine upon so grand a scale, nor from the pure juice only, of the grape. It will satisfy me if I prove that excellent good wine can be produced in small quantities in every family where one or two good trees are made to yield from 50 to 100lbs. annually of sound fruit; or, if the climate be unfavourable to the maturing process, (as may be the case further north than the midland counties, generally,) that the unripe berries of any sort of vines, no matter what, or even the leaves —will afford a very sufficient substitute. I should be remiss were I not to recommend to every person whose object it may be to work upon scientific principles to possess himself of that most useful book, entitled "*Remarks on the Art of Making Wine*," by Dr. John Macculloch. The philosophy and rationale of every process, including those of the foreign vintages, are therein investigated; and no one attached to chemistry can rise from the perusal of the work uninstructed or ungratified.

He says—"Of the numerous varieties of grapes, it is obviously necessary to select for our purposes those which are most early, if it is our desire to produce in every season a ripe crop. Of these the *auvernat*, the *miller*, the *white muscadine*, the *white* and *black chasselas*, the *black sweetwater*, and the *black Hamburg*, are among those which ripen earliest, and with the greatest certainty."

Grape culture, for the prodution of wine, may be restricted to the varieties now named, and for this simple reason, that the trees in almost every season yield ripe fruit in perfection, from which red, as well as white wine may be prepared.

1. *The White Sweetwater.*—"Berries, large, round, of a white colour, and when highly ripened, especially when exposed to the sun, they are shaded with a light russet." The tree is a free grower, and extends with rapidity, though the joints are not by any means long. Hence, it is very prolific; for, by the time the rod has had three years' growth, every joint will produce two or more spurs, each bearing two or three bunches, and these will weigh from six or eight, to fourteen or sixteen ounces. The leaves are large, of rather a coarse texture, and change to a motley yellow before they fall. The berries being closely packed, are much improved in every respect, by being timely thinned out with grape scissors.

2. *Pitmaston White Cluster.*—This is said to ripen more early than the common white sweetwater.

3. *Black Cluster.*—It has numerous synonyma, viz. black morillon, and auverna of Miller; small black cluster. "This is the true Burgundy grape, and is readily distinguished from the other," (Miller's Burgundy,) "in not having its downy appearance; it has also large berries, and they are not so closely set upon the bunches. It might be successfully cultivated in this country for wine. In Burgundy it is highly esteemed for this purpose." I had a cutting of this grape in 1831. It had two or three eyes, and was simply stuck in a border by the south-east wall of the house. In 1833 it bore abundantly upon spurs. I have cut out several rods above twelve feet long, and have produced bunches in a pot. The great plant has now upon it twelve

fine upright shoots; six of these have borne much fruit, and some are cut back at the utmost height of the wall.

4. *Espertone.*—Hardy blue Windsor, or Turner's black. This is a most prolific grape, with strong, vigorous wood, and large berries, approaching in character to those of the Hamburg, but arriving more certainly, and much earlier, to maturity.

5. *The Claret*, or blood grape, must be added, because of its colour, and the astringency of the fruit, which qualify it to produce the finest red wine. The leaves, also, change late in autumn to a deep red, and yield by infusion a liquor of exquisite colour. I am aware that some may dispute the propriety of introducing this vine, because it is believed to be tender; but I know that in the late summer its bunches became ripe before those of the sweetwater, upon the same wall; and, in the year 1828, after a wet summer, the berries became fully ripe. The claret appears to me to be tardy of growth, while young; but, that it is a sure bearer when trained on a south or south-east wall; and, provided the bunches be left on the tree till the leaves turn red, the fruit loses much of its acridity; and then, both bunches and leaves can be employed for wine-making, without doing the tree any injury.

Vines may be raised by cuttings and layers. Nurserymen prefer the latter method, and it sometimes is desirable to procure a set of plants of a full size, in the first instance. But if cuttings can be procured, excellent plants can be readily formed by two methods, which I shall shortly describe. It is usual to take a shoot of the last summer's wood, and to cut it into lengths which contain each three eyes, or buds; two of these are thrust into the ground, the third remains just above the surface of the soil, and developes the future plant. This mode is sufficiently sure, but it is inferior to that recommended by the great Philip Miller, but which has since been practised and advocated as something new. To make a good cutting, take a *fruitful spur* of a well-known and fertile vine. Cut it off with an inch or two of the old wood from which the spur emerges. This wood may be two, three, or more years old; it should have on it a piece of the last year's wood with two fine eyes, besides the small embryos near to the junction of the two woods. The cutting will, as Miller observes, appear like a small hammer, the young wood being the handle. Make a hole within five or six inches of the wall where the tree is to remain, and insert the cutting with the old wood at bottom, so deep, that the upper eye shall be at the surface of the soil. This may be effected at the season of pruning the vines, in September, October, or November, as the case may be; because, for a reason to be adduced, it is desirable not to defer the pruning of vines till February or March. Shoots from such cuttings will sprout with vigour, and prove of fruitful habits: in fact, the cutting ought to be one which should bear grapes were it left upon the parent plant. Long shoots of the year are untried, and have all their work to do: those which emerge from old fruitful spurs have their habit already confirmed.

A second method of operating, makes a tree at once; and for this method the public is indebted to the clever gardener of his grace the Duke of Portland, at Welbeck, Mr. John Mearns. But it requires a hot-house or some sort of pit where bottom heat can be applied. They who have adequate machinery at command, may ascertain, by this method, the precise nature of the fruit they are about to propagate;

and, in fact, the experiment throughout its entire course is, in every respect, beautiful and interesting. It has been amply described in the *Horticultural Transactions*, the *Gardener's Magazine*, and *Horticultural Register;* but still, numbers may not have heard of it; and, as I have not only received direct communication of the subject from the able inventor, but have so far practised the method as to be enabled to vouch for its feasibility, I am called upon to say a few words in order to introduce it to more general practice.

We will suppose that, in the course of training a vine upon the long-rod system, a branch of twelve, sixteen, or twenty feet, which has borne grapes for two or more years, has by it, a young shoot which could be made to occupy its place on the wall. Cut out the old branch, provided it have, at its summit, from three to six feet of last year's wood, that *will bear* in the ensuing summer. In the next place, cut off, or blind all the eyes upon the old wood, below the terminal new shoot. Coil this old wood round and round, in a large garden pot 12 inches wide, and as many, or more, deep; having first laid an inch or two of broken pots or cinders at the bottom, to serve as drainage. When all the old wood has thus been wound round the sides of the pot, as evenly as possible, press into the pot a rich soil composed of chopped green turf from a meadow, or pasture, three parts, and one part of black reduced dung; or, *that one part* may be made up of three-fourths of rotten dung, and one-eighth, each, of bone dust and lime rubbish. The compost must be well worked up, and pressed firmly between the coils, so as to act on every part of the wood equally and simultaneously. A number of pots may be thus prepared, and all, or any part of them plunged to the rims in a bed of leaves, or other fermenting materials, whose heat shall not exceed 65 or 70 degrees. The atmosphere of the house or pit should be below that average, because it is intended to produce an abundant supply of radical feeders before the young buds emerge. Mr. Mearns recommends, most particularly, that the whole shoot, *above the soil*, be enveloped in moss to its extreme points, which moss is to be tied on with strands of bass matting, and constantly kept wet, by the syringe or water-pot. Care must be taken, however, not to bind the bass round the eyes of the vine. It will also be prudent to press three or four stakes into the soil of the pot, and to fasten the shoot to them, in a continuous *spiral* coil. This form will promote the regular growth of all the buds, by counteracting the tendency which the vine evinces to push its upper buds vigorously, while the lower remain weak or dormant. Things being thus disposed, the pot surrounded by a mass of leaves at from 60 to 70 degrees, and the shoot above the soil merely assisted by an atmosphere of from 45 to 50, and a covering of wet moss; fibres will soon be propelled into the soil; and, by the time the buds begin to break, and show themselves through the moss, the plant will be furnished with an amazing number of vigorous absorbers of nutriment; in fact, from every joint of the coiled wood, numerous fibres will arise, many of which will ultimately find their way through the holes of the pot into the bed of leaves. The protusion of the buds during the continuance of low temperature above, and a comparatively exciting heat below the surface, will inidicate the progress of the roots, and, also, the necessity of increasing temperature. This must be cautiously raised to 55, 60 and 70 degrees; and, if the cutting be a good one, and the treatment judicious, a crop of perfect grapes will be secured,

equal, (in bulk and quality,) to that which would be yielded by a similar extent of rod upon an ordinary plant, either in a pot, or on a rafter.*

I must not dwell upon the subsequent management of the growing wood and fruit; these should be attended to as those of other vines usually are. My object is, to prove that a perfectly rooted plant can be brought forward in three or four months, from an unrooted shoot, which shall not only yield fruit during the period of its progress, but furnish a fine tree for the wall of the garden by the following autumn. The fruit will be proved by this process. But if a vine be already well known, it will perhaps be better to select a yearling shoot, ten or fifteen feet long, to disbud that to within the two uppermost, strong eyes, and to coil the whole shoot, leaving the upper bud just under the surface of the soil. Fruit will not be obtained, but one strong shoot will be formed which ought to be stopped three or four times, at every four feet of growth. Thus, under propitious circumstances, a fine plant, ten or twelve, perhaps twenty feet long, will be raised, whose wood will be perfectly ripe by October, although the cutting has not been excited before the middle of March. Vines so raised may be planted in the border in the autumn: the roots should be uncoiled and laid carefully on fine dryish earth, be covered with the same, mulched with long litter; and in the rise of the year, (a month at least before the advance of the sap,) be pruned back to three of the best, *lowest* buds.

The soil of a vine border is generally considered as an affair of the last importance. But the tree will always prosper, provided it have a good bed of loam, twelve inches deep, wherein it may extend its roots horizontally. A dry subsoil of rock or chalk, naturally, or a deep, firm stratum of stones, bricks, or chalk, placed artificially, rank among the chief desiderata of successful vine culture. Lime rubbish, chips of stone, flints, worked among sound loam, to the depth of not more than twelve inches, appear to me to furnish a better staple for the vine, than stimulating manure of any description.

A sunny exposure and dry permeable soil, are great advantages; but such is the accommodating nature of the tree, that I have seen it ripen its fruit on a branch situated behind a mass of trees and evergreens, upon a wooden paling with a south-east aspect, where not a gleam of sun-light could reach it after ten o'clock in the morning.

We will now suppose the trees to be planted against a wall or paling, from six to twenty feet high. They are cut back to three buds, and are thus prepared to start. Each bud breaks at the proper season, and three shoots are formed. If these can be led equally, they may all be preserved; and are then to be secured against the wall, at an angle which will tend to maintain equability of growth. If the vines be strong, and the soil suitable, three shoots, of at least one-third of an inch in circumference, and from eight to twelve feet long,

* It will be just to one of the oldest and best vine growers now in practice—Mr. George Stafford, gardener to Richard Arkwright, Esq., of Willersley Hall—to state, that his method is somewhat different. Plants are raised from eyes during one season, planted in large pots in the succeeding year, and cut down to one eye. The plants are exposed during the winter months, and in the third year, when excited in the stove or vinery, produce from ten to thirty or forty bunches each.

will be perfected by the end of August. I will presume that the central shoot is trained upright, and the two side shoots at an angle which will correspond with that of the bud at its first sprouting from the stem; in this case no constraint will be occasioned, and the growth will be regular. About the end of September, let the two side branches be shortened to two-thirds of their length, or so as to leave them an equal number of buds; and cut the shoot off an inch above the bud, slanting in the direction of that bud; then train the shoots horizontally, six inches above the surface of the soil. Cut back the central shoot to six or eight buds, and train it upright. As winter approaches mulch the border just around the roots, with littery dung, or half decayed leaves. Thus the tree remains in a state of rest during the winter, and this repose is induced rather early, by the September pruning.*

When the buds break in the spring, let the uppermost best shoot from the central branch proceed directly upwards, and select the strongest and most equi-distant shoots which push from the horizontal branches. Retain one on each side, and about a foot from the central leader, and let others, at nearly the same distance from each other, to the right and left, be trained perpendicularly up the wall; then rub off all the other buds on the horizontals, excepting the one at the end of each shoot; when these grow, they are to be led on to the right and left. In the progress of the advancing shoots, claspers or tendrils, and lateral, secondary shoots, will at all times, even in the first year's growth, be produced. I forgot to mention this circumstance, but the laterals should be displaced whenever they have grown from four to six inches long, by pulling them sharply downwards from the bud. Some recommend to cut or pinch the laterals at one eye, above the mother branch, leaving the leaf on the shoot. The former method did no injury to my vines, and it obviated the necessity of pruning away the stubs which would be left. The claspers ought to be pinched off quite close, almost as soon as they appear. The pruner must bear in mind, as the ground of his practice, that *fruit can only be produced upon young wood of the current year, proceeding from the wood of the last year.* Upon this principle, it will be evident that, in the state of the vine just described, there will be three shoots of wood, say of 1834, each prepared, if the tree be strong, to produce young fruit-bearing shoots. But it should not be the object of the grower to let things take this natural course; he should provide a supply of upright shoots at one foot apart, as before directed, all proceeding from horizontal branches; and two terminal shoots to continue the lead of these horizontals. All these preparatory branches must be divested of fruit, of every tendril, and also of every lateral. The tree then will be formed of a certain number of clear, perpendicular branches, during the current year, (1835,) and these will be strong enough to bear a good crop in 1836. One point more, appertaining to 1835, remains to be noticed. A *central shoot*, with six or eight buds, has been left. Most gardeners would direct this to be taken out, at the September pruning, on the ground that, having performed its office of strengthening the radical processes, it would

* Early pruning is recommended, particularly because there is reason to believe that the vine so treated breaks sooner, and therefore presents its fruits to the full sun of summer. This is of great consequence to vines in the northern counties, where grapes seldom ripen if the berries be formed late.

destroy the balance of the tree. I agree that, were form alone consulted, it would be better, generally, to remove this lead; but, I choose to retain it, during one season at least, for the two following reasons:—

This central branch, if the growth be such as I have witnessed, will be in condition to bear a bunch of grapes upon each of the eyes, with the exception of the lowest and the uppermost, and the management of the few shoots to be produced, will instruct any person of discernment in the method which must be pursued in the subsequent treatment of the tree. We will suppose that all the buds expand, the upper one will, in most cases, prove the most luxuriant; and, as it is designed to take the lead, and be trained upright, it must not be permitted to bear fruit. The lowest bud will, most likely, be the weakest, yet, fruit may appear upon it; in any case, however, this shoot is to be suffered to grow, but not to bear. The five or six intermediate buds may be permitted to push till they show what they will produce. Perhaps a bunch may be seen at the very first emergence of the leaves of one shoot; on another, two or three joints may be formed before a bunch appear: thus, there is some uncertainty, and time must be allowed to ascertain where the fruit shall be situated, what its strength, and whether there be more bunches than one upon a shoot. When the power and fertility of each is discovered, the best bunch only is to be retained, if there be two, and the point of the shoot is to be pinched off with the thumb nail about an inch above the leaf of the joint next above that which has the fruit. All the other laterals are to be similarly treated, leaving but one bunch upon each. They will all push again; and, when these secondary shoots have produced two or three joints, they are to be shortened, just above a leaf within one or two joints of the primitive lateral; and so on throughout the growing season. I have thus presented the reader with the first course of spur training, wherein each fruit-bearing shoot is to be first shortened, and then nailed at a natural angle against the wall, and kept short till the fruit be ripe. While these processes go on, a lowermost shoot advances, which may either be secured by nails, or tied pretty close to the central stem: this shoot may, in the following year, succeed to the one now in bearing: hence, it is retained. A leading shoot from the upper bud is also in progress, and this should be permitted to reach the top of the wall or house. In fact, it may grow either directly upright; or, (if the wall be under twelve or fourteen feet,) in a horizontal direction, to the extent of ten, twelve, or fourteen feet. In September the growth will cease, the wood become of a clear brown, and were the branch to remain, it might be pruned in the way now to be described: The point of the leader should be cut back above an eye, near the summit of the wall, and each lateral, which bore the fruit, cut to an inch above the first well-swelled bud beyond the old wood from which it has its origin in. The lowest long shoot might be cut out, and coiled for a new plant; but I should, in preference, recommend the removal of the bearing shoot, that it may be coiled for a *bearing, potted* vine, and give place to the lowest young shoot. Thus, regularity in age will be provided, the tree will be furnished alike throughout all its parts, fruit will have been tasted, and the method of spur pruning clearly appreciated, if not practised. I have dwelt somewhat at length upon these initiatory directions, because they give a precise detail of my own experience, which has been productive of a fertility that has been extremely gratifying. It is of some conse-

quence that branches of the same age be provided at similar distances from each other, and pruned to about the same height. A foot asunder will allow space to train in the fruit bearing laterals; and these will become, every year, more productive; for, two or three bunches may be allowed to ripen on each shoot by the time that the tree shall be six or more years old. This method of training is, by no means, new; it differs little from that of Speechley, as described in Lindley's "Guide;" but, it embraces rather more extent: in fact, a vine, by being formed with perpendicular bearers, from a general horizontal main-stem, can be led to any reasonable distance; but, its energies will be assisted by bringing down the horizontal branches, so that at the age of three or four years, they may rest upon the soil, or, rather, be covered by it. Many masses of roots will be then protruded, at various points, and the tree will thus become a series of sub-independent plants. I adopt this method with the sweetwater, black cluster, and black frontignac.

On a future occasion I may recur to the treatment of the vine, as too much cannot be done to insure the prosperity of this easily managed and grateful tree.

*(To be Concluded in our next.)*

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## *Productive Power of Land.*

[FROM THE SILK CULTURIST.]

FEW farmers, in this country, are aware of the immense productive power of land perfectly cultivated. The notion that large farms are indispensable to large agricultural operations always prevails in new countries where lands are cheap and cultivation imperfect; but as a country progresses in age, and lands advance in price, it is discovered that the product and profit of a farm depends more upon its cultivation, than the number of acres it contains. At the first settlement of this country, by civilized men, it was a wilderness, and lands were purchased of the natives, for articles of clothing and ornament of trifling value. This induced our ancestors to make themselves proprietors of large tracts of wild land without reference to their ability to cultivate them. The consequence was a low standard of husbandry. But as these extensive tracts were afterwards divided and subdivided, as the increase of population and the exigences of families required, it began to rise and has been slowly progressing until it has arrived to its present state, but which is very far below what it was in the old world long before the christian era.

It is supposed that agriculture has never been in a more flourishing condition and cultivation carried nearer perfection, than it was in ancient Rome five hundred years before Christ. The principal assignable reason for the agricultural prosperity of Rome, was the size of farms which were circumscribed within very narrow limits. The farm of Manlius Curius Dentalus, one of the greatest Roman farmers, consisted of but four and a half English acres. He was three times chosen consul, the highest ordinary office in the State, and for a time, commander-in-chief of the Roman army, and yet he derived all his subsistence from his farm. For his splendid victory over Pyrrhus, he was offered more land by the government: but he declined it, assigning as a reason, that should he even aspire to more wealth and possessions than he already had, he should become an ambitious, and con-

sequently, a dangerous man to the liberties of his countrymen. That famous Roman farmer Cincinnatus, about whom so much is said of his being called from the plough to the command of the Roman army, had only two and a quarter acres of land. His original farm contained seven jugera, about four and a half acres, one-half of which he had been compelled to dispose of to raise money to pay the debts of an improvident son.

But nothing will better illustrate the importance of perfect cultivation, and the astonishing productive power of land under it, than the story of Paridius, the Roman vine-dresser. He had a vineyard and two daughters. At the marriage of the eldest, he allotted her one-third of the vineyard as her portion, and, astonishing as it may seem, succeeded in making the same crop from two-thirds, which he had formerly made from the whole. At the marriage of the other daughter, he apportioned to her one-half the remainder, and yet his crop was undiminished.

We are not among the number, who believe it necessary for our young agriculturists, to penetrate the western wilderness for the purpose of obtaining a subsistence or accumulating wealth—we are not of the opinion of the farmer who removed one hundred miles from his neighbours to avoid being annoyed by them, and when one of them located himself within fifty miles of him, considered it an insult, and said he did not thank him for sticking down right under his nose. Neither do we believe that war, pestilence, famine, intemperance, and crime are necessary, as checks upon the increase of population and preventives of a redundancy which the products of the earth could not sustain. But we do believe, that in the present state of the arts, rural economy may be carried to such an extent, that even New-England might sustain, in comparative comfort and affluence, more than fifty times its present population.

That we have not overrated the productive power of land, perfectly cultivated, is evident from the fact, that there are large provinces in India, where a population of from four to six hundred inhabitants to the square mile, are supported by agriculture.

There is also an island on the eastern coast of China, containing one thousand square miles, and a population of 400,000. Agriculture, and horticulture are the exclusive pursuits of the inhabitants and their crops are limited to rice, cotton, millet, and culinary vegetables.

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## *Time is Money.*

[FROM THE YANKEE FARMER.]

FEW know that time is money. Time well improved will earn money, or it will procure that which money will buy, and therefore we may say, time is money.

Often remember, therefore, reader, that time is money. Time is money to yourself. When you lay in bed in the morning, beyond the hours necessary for sleep, the body is weakened by indulgence, and the noxious effluvia and moisture, that have been thrown from the skin, are absorbed again, and the health is injured, and time is lost besides, and money is lost. You suffer, and your family suffer. The door-yard is not so neat. Your wood is not so well cut. Your clothes

is not so well cut. Your tools are not in so good order. Your clothes are not so well mended. Your walls and fences are not up so well; and then you are not on so good terms with your neighbours. If you lay in bed half an hour needlessly in the morning, most likely your bible is not read, and your duty to your Maker is forgotten or neglected. Up then, slumberer, time is money, and more than money.

Do you smoke? Remember that time is money. It is well to know and use figures. Let me see. Ten minutes smoking before breakfast; ten minutes after; ten minutes at dinner time; ten minutes when a pedler calls; ten minutes when you call at a neighbour's; ten minutes when a neighbour calls; ten minutes at night. Seventy minutes each day in smoking. Time is money. Seventy minutes is worth at least ten cents to a man. Ten cents a day is thirty-six dollars and fifty cents a year. If you smoke, very probably, you, your family and the community lose the value of thirty-six dollars and fifty cents each year by your smoking.

Time is money. Let this enter into your calculations; you mean to be saving, and you make a wooden latch to your door: and spend in labour one-third of a day, and find yourself and tools and stock; and all this we may call twenty-five cents; when you might buy an iron latch for half the money. Or you are more economical still; and you get neither an iron or a wooden latch; but open and close a door just as you can, and then all your family lose in one year, time equivalent to one dollar, or even two, or three, or four dollars.

Time is money to your neighbours. You employ a mechanic, and you owe him; and if, when you call for your work, you would bring a bushel or half a bushel of corn, time would be saved. But you make him call on you just when he is out of bread. He has to look round for a horse and wagon, and then look after you, and get your corn, and he loses about half a day, and his tools, shop and work stand idle; and time, which is money, is lost.

Time is money. When you stand still, does the sun stand still? Does time stand still? Do the expenses of a family stand still? Does the season stand still? Does life stand still?.

You complain that you are poor. You can't take a newspaper—the Yankee Farmer, the Maine Recorder, a temperance paper, a religious paper. You can't read the papers; you can't buy and read any books. The reason is you do not know that time is money.

But time is more than money. If time is lost, information is lost: good moral habits are lost; high attainments in religion are lost, opportunities to help our neighbours are lost; and finally, if time is lost, even the soul may be lost.

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## *New Method of Cultivation.*

[FROM THE SILK CULTURIST.]

We have repeatedly remarked that one fact on practical subjects is worth volumes of the most ingenious theories, and the more we reflect upon its application to the culture of silk, the stronger are our convictions of its truth, and the danger of wandering into the unexplored regions of the imagination, without a compass or chart to direct our course. Though we have hitherto confined ourselves strictly within the range of facts and experiments, and intend to do so in future,

yet, in common with our fellow men, we have our speculations, theories and notions, some of which we intend, from time to time, to throw out for the consideration of cultivators, in the hope of provoking experiments, and thereby add to the common stock of practical knowledge on the subject to which we are exclusively devoted.

Among these speculations is a new method of cultivating the mulberry, without tillage, after the plants are five or six inches out of the ground. For the suggestion of this method we are indebted to Mr. James Camak, of Athens, (Geo.) who has tested its applicability to the culture of Indian corn. His experiment was made on poor land, which he ploughed well, and planted in drills three feet apart, leaving one foot between the stalks. The land was infested with crab grass, a most formidable enemy to encounter, and which, when the corn had put out four or five blades, completely covered the ground, choaking the corn and causing it to turn yellow.

With the field in this condition he first spread a small quantity of stable manure around the corn, and then covered the vacant ground with fallen leaves from the forest to the depth of three or four inches. The leaves were gathered and spread while the ground was wet, to prevent their being blown away by the winds, and care was taken to leave the tops of the young corn uncovered. In ten days the grass was entirely destroyed and the corn assumed a healthful colour and grew luxuriantly. No further attention was given to it, and the product was at the rate of forty-two bushels to the acre. The advantages of this method, as noted by Mr. Camak, were, that during its growth it was always forward of that planted by its side and cultivated in the usual manner—ripened almost ten days earlier—the blades did not curl up during the hottest and dryest days—in the dryest weather the ground was moist to the surface, and loose as deep as it has been at first breaking up, and the heaviest rains had very little effect in washing the soil and making it hard.

That the decayed foliage of deciduous trees are among the most valuable manures, there is no doubt, and the facilities which most farmers have for procuring them in large quantities, ought to stimulate them to repeat the experiment of Mr. Camak on their other crops as well as corn. He inquires whether the same process may not be successfully applied to the culture of cotton, and requests that it may be tested by experiment. We hope the experiment will be made, and also in the cultivation of mulberry trees. If it succeeds it will make a considerable saving in labour and expense, and we should judge give trees a more healthy and vigorous growth. But it is as yet theory, and its correctness must be ascertained by experiments.

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## *Hoeing Corn.*

[FROM THE YANKEE FARMER.]

THE object of hoeing and working the soil about corn, are, first, to destroy all weeds; and secondly, to loosen the soil at the surface, that it may the more readily absorb dews and rain which fall upon it, and prevent the evaporation of moisture, which takes place much sooner where the soil is hard, than where it is kept loose and mellow. The practice so prevalent, of deep cultivation by the plough between rows of corn, is not to be recommended. If the ground has been proper-

ly prepared before planting, when not too wet, it will not need this additional loosening. After the corn has arrived at the usual size for hoeing, the soil should only be disturbed at the surface. For as the plants increase in size, they send out long fibrous thread-like roots in all directions, which branch every way and run all over the ground; and it is through these that they receive a large portion of their nourishment. To break or injure these would therefore materially retard the growth of the plants by cutting off their accustomed supply of food. And yet surprising as it may seem, a notion is very prevalent, that it is serviceable to break the roots of corn. But what should we think of such reasoning as this, were it applied to animals. What should we think if it were declared to be serviceable to cattle to deprive them of their supply of food? Or, as a writer somewhere asks, what would be thought of the reason of a man, who should declare it as his opinion, and practically enforce it, that the best way to fatten a bullock, is to wound his tongue, break his teeth and batter his jaws, whenever he reached forward his head for food? Why then treat plants, which, as much as animals require their proper nourishment, in the same way?

Hilling corn we would also disapprove, although it is very commonly practised. Not unfrequently in performing this operation, all the loose mellow earth is scraped away from between the rows and heaped up round the plants, forming a sort of roof about them, throwing off the rain, which runs down into the hard soil thus laid bare at the bottom of the furrows, which the first dry weather bakes to the last degree of hardness, so that the roots can receive no moisture here, and little within these artificial pyramids. A reason is assigned in favour of hilling,—that it makes the corn stand firmer and more erect, and is less liable to be broken down by the wind. This may be the case when the plants are small and do not need any such help; but when they attain a height of several feet and are loaded with leaves and ears, it must be evident that a little loose earth piled about the roots is totally insufficient for such a purpose. It is the strong bracing roots which radiate from the stock which are to support it there; and to bury these roots deep under the surface while they are growing, and thus shut out from them both heat and air, and render them weak and tender would only help to bring about the very thing we wish to prevent.

It is important to farmers that this subject be well understood; for a little knowledge may save many weary steps, and be the means of an abundant crop in the bargain. But if any farmers doubt the accuracy of our reasoning, we would request them to test it by experiment; by ploughing and hilling high one part of their corn, and using the cultivator and applying the same amount of labour in mellowing the flat surface of the other; and then measure the results.

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## *The Dairy—Cheese Making; by* W. G.

[FROM THE GENESEE FARMER.]

THE greatly increased demand for the products of the dairy, and the consequent rapid advancement in price—the comparatively small amount of capital required for a beginning by the small farmers of the country, and the avoiding the expenditure necessary where several

labourers are employed—and the spreading conviction that the profits of the dairyman, if not as great as the profits of the wheat-grower, are far more sure, has induced many of our farmers to turn their attention to this subject, where, with proper management, they are certain of an abundant reward for their labour. There surely can be no reason why cheese may not be manufactured in the United States equal to any in the world; yet as a whole there can be no doubt that American cheeses are far inferior to those produced in England, and some parts of Holland, Germany and Italy. The causes of this inferiority must be sought in the different and defective modes of making practiced in our country. We sometimes meet with a cheese equal in quality to any that can be produced in any quarter of the globe, but that, perhaps, is the only one the dairy that furnished it can show of a similar quality. Such would not be the result, if the business of the dairy was carried on upon fixed and correct principles; an entire uniformity in the flavour and quality of the cheese, is a marked characteristic of the best foreign dairies. As the result of some observation and experience, we give it as our opinion, that the reason why there is so much ordinary cheese made in this country is, that little or no attention is paid to the quality of the rennet; and the temperature of the milk being left to chance, is constantly varying from day to day, necessarily affecting the quality of the curds.

It is evident the rennet must have a great effect in determining the good or bad qualities of a cheese, yet in many if not the most of our dairies, it is prepared in the most careless, not to say slovenly manner imaginable. Every thing relating to cheese should be kept perfectly clean, yet rennet is sometimes used, the odor of which is any thing but ambrosial, and it is well if a close examination does not show living proof, that the invitation sent abroad on the tainted air has not been in vain. Some of our dairy women maintain, that the quality or flavour of the rennet is of no consequence, as it passes off in the whey; but this is a great mistake, as is well understood by those who have paid the necessary attention to the preparation of rennet. At the celebrated dairy farm of Heyward, in England, the rennet is prepared by putting two gallons of brine to six calves' stomachs, at least one year old, to which is added two or three sliced lemons, and after standa few weeks the liquor is bottled for use. It is not used till two months old, and the older it is, the better it is considered. In some other dairies, cloves, sage, and other aromatics, are added to the rennet with the lemon. A stone jug that will cork tight is the best for the preservation of rennet, as the air should be carefully excluded after it is once prepared.

To produce uniformity in the quality of the cheese of a dairy, the milk at the application of the rennet should be of a uniform temperature. This in most cases is left to chance, the hand of the dairy woman being the only guide, whereas a thermometer ought always to be used, and whatever rate be adopted as the standard, the milk of each day should be made to conform to the rule. At the Heyward farm, and in others where double Gloucester is produced, the standard is 85°. From that it ranges to 95°, which is the highest admissible in the manufacture of cheese, as a greater degree of heat renders the curd two hard and firm. Should the milk when brought from the cows and placed in a tub or vat for being converted into curd, be found to have sunk below the proper temperature, a quantity must be warmed sufficient to raise the whole to the desired point.

To a neglect of these two things, quality of rennet and proper temperature of the milk, we believe most of the defects in our cheese are owing; and if these difficulties were obviated, we have no doubt that many of our dairies would produce cheese of uniformly good quality. Now, in purchasing a lot of cheese, the buyer is pretty certain of getting some that will be first rate, some that are middling, and some that would choke a dog, so hard and tough are they. We read not long since, in some of the scientific journals, that the Germans had succeeded in converting a pine board into very palatable six penny loaves; and had they asserted that the same persons had converted a white oak plank into cheese, we should have been equally ready to credit them, as we have ourselves seen some that approximated marvellously near to that same wood in outward appearance and inward quality, so far as hardness and toughness were concerned.

There are but two kinds of English cheese, the manufacture of which could be introduced into our dairies with much prospect of success or remuneration; these are the Gloucester and the Stilton, and in some of our dairies, at present, cheese nearly approaching these in quality is produced. In making both these kinds of cheese, there are some peculiarities which must have a decided effect on the quality, yet which have been introduced in full, in very few, if any dairies, in this country. The double Gloucester is made from the night and morning milk, the cream taken from the former. Single Gloucester is made entirely from the skimmed milk. In making Gloucester, the milk is set at the temperature of 85°. After the rennet is applied and the curd is hard enough to break up, it is very slowly and gently cut up with a three bladed knife, the blades reaching to the bottom of the tub and one inch apart, both ways, that the whey may come out as clear or greenish as possible. As the curd settles, some of the whey is dipped off, and the curd is again cut up. This operation is repeated until the whey is entirely separated, and no lumps remain in the curd. The curd is now put into the vats or hoops, and pressed down with the hand. The hoops covered with fine cloth are put in the press for half an hour, when the curd is taken out, cut into thin slices, and put into a wooden mill, which tears it into pieces not larger than small peas. This process of grinding is preferable to breaking up by hand, as the butter is not forced out, and the curd unites better than when made fine by chopping, as is generally practised in this country. In some instances a second similar breaking up or grinding of the curd is performed, and after being made as fine as possible, the curd is again put into the cloths and hoops, a little hot whey or water being thrown on the cloths, to harden the outside of the cheese and prevent it from cracking. After being in the press two hours, the cheeses are taken out and dry cloths applied, and the same operation of turning and dry cloths is repeated during the day. A striking peculiarity in the Gloucester cheese is the manner of salting. None is used until the cheese has been made and in the press twenty-four hours; and even then it is not begun unless the cheese is all closed, since if there be any crack in the cheese at the time of salting, it will never close afterwards. The salting is performed by rubbing the cheese over with finely powdered salt. The cheese is then returned to the press. The salting is repeated three times with the single, and four times with the double Gloucester, twenty-four hours being allowed to intervene between each salting. The double Gloucester remains in the presses five days, the single four, when they are put on a shelf

or floor of the dairy, and turned twice in twenty-four hours. Gloucester cheese is distinguished for its smooth, close, and wax-like texture, and its very rich and mild flavour. If the curd is salted before being put into the hoops, the salt has the effect of giving a skin to each of the particles of the curd it comes in contact with, which prevents them from intimately uniting. It may be pressed together and become good cheese, yet it never becomes a smooth close mass, like that which is salted after it is made, being always liable to crumble when cut, a prevailing fault with American cheese.

The cheese called Stilton cheese, is principally made in Leicestershire, near Melton Mowbray, and the adjacent villages. It is a very rich cheese, rarely used for the table until two years old, when by becoming partially decayed, blue, and moist, it acquires the particular flavour which causes it to be so highly prized by the dealers. The following is the most simple process of making it. To the new milk of the cheese making morning, add the cream of the milk of the preceding evening, together with the rennet; the separation of the curd must be carefully watched, and when complete, it must be removed from the whey with as little breaking as possible, and placed in a seive, until of such consistence as to bear being lifted up and placed in a hoop without much pressure. The cheese as it dries will shrink up, and must, therefore, be placed from time to time in a tighter hoop, and turned daily, until by gradual drying it acquires the proper consistence for keeping. By this process none of the cream is lost, and the curd not being broken remains more entire and uniform in its texture. It may not be amiss to remark, that notwithstanding the high price of the real Stilton, and the estimation in which it is held, the preference is rather acquired than natural, few preferring it at first to the Gloucester, or any other first rate cheese.

Formerly various colouring matters were used to give colour to cheese, some of which were decidedly deleterious; but all these have been superseded by arnotta, which is not only perfectly innocent in itself, but produces a better colour than any thing else. It is used in various ways; in some dairies it is dissolved in weak lye, and kept bottled for use; in others it is rubbed on a plate in the milk until sufficient is introduced; of course the quantity used will depend on the judgment or taste of the cheese maker. If cheese cracks, the common red pepper added to the butter used for rubbing them, until it is very strongly impregnated, and applied to the defective places, will have a tendency to prevent flies and bugs from becoming mischievous, and producing injury. Many dairies within a few years have introduced the practice of putting into their cheese a small quantity of saltpetre, which it is imagined renders the cheese more tender, while it does not detract from its flavour. We have doubts, however, whether the addition of any such ingredients has a real tendency to improve the products of the dairy, and in some instances they have proved positively injurious.

We may ere long return to the subject of the dairy, and endeavour to furnish some data, by which its relative profits, compared with other branches of agricultural industry, may be estimated.

W. G.

## *From an inquiry into the causes of the fruitfulness and barrenness of Plants and Trees; by* JOSEPH HEYWARD, Esq.

[FROM THE FARMER AND MECHANIC.]

"Such, then, being the laws and principles ordained by nature, for originating, governing, and determining the growth and production of vegetables, are they not corroborated by such existing facts, as will admit of the deduction of certain axioms or rules, for the guidance of a gardener in the practice of his art?

Certainly: and it will be proper to divide, explain, and reduce them to some such orderly arrangement, previously to entering upon an exposition of a system of practice. The chief object for which plants and trees are cultivated in the garden and orchard, are the flowers, seeds, fruit and roots; our first care must, therefore, be, to bring them to, and sustain them in the most perfect state of fructification. The leaves and stalks also being of considerable importance, both as objects of use and ornament, the growth and disposition of these must likewise be regarded. Now, as for whatever purpose we may suppose vegetables to be created, it is clear that all kinds of plants and trees proceed by progressive degrees in these growths to attain fructiferous; and that in their advance from the seed to the attainment of their utmost size, the formation and arrangement of their leaves and branches are made conformable to the most perfect and symmetrical designs; the practice of gardening can be little more than the assisting of nature in the attainment of her ends, by supplying the required nourishment, and affording her support and protection against casual obstruction and injuries. To obtain the desired results of horticulture, therefore, our principal care must be so to regulate the operations of art, that they may be in perfect harmony with the laws of nature: and as it is of the highest importance that these should be firmly imprinted on the mind, we shall first recapitulate and arrange the laws of nature to which the principal effects are traceable: they may be comprised under the thirteen following divisions.

1st. The generating, or first forming of a plant, or impregnation of the seeds with the living principle, requires the junction of two distinct parts of productions of the blossom or flower; that is, it is required by nature that the pollen or dust produced by the antlers be brought in contact with or placed on, the crown or summit of the pistil.

2d. To enable the pollen to impregnate the seeds with the living principle, a certain degree of heat is necessary, according to the nature of the plant; some requiring a greater and some a less; but most plants require a degree of heat above 50° Fahrenheit's thermometer, when placed in the shade, and that the sun should shine on them for two or three hours, during some part of the day, for four or five days following, when in bloom, for the purpose of performing the office of incubation and hatching the globules, which form the pollen. and it is allowed by nature that the pollen of one plant, when thus brought in conjunction with the pistil of another plant, although a variety of the same species, shall produce the like effect of impregnation; and that the progeny of the two plants shall in some degree partake of the peculiar characteristics of both of them.

3d. To vegetate seeds, or give the necessary impulse to the living principle, and put it into action, a due quantity of water, and a due supply of oxygen, or a free access of the atmospheric air, and a degree of heat above 50° Fahrenheit, is necessary.

4th. Plants, like animals, require a constant supply of food to sustain them; and as from their peculiar formation, plants cannot consume or take any thing into these bodies but in a state of liquid, water holding in solution a certain portion of carbonaceous matter and earth, constitutes the nutriment or food of plants; and a continued supply, change, or circulation of water in the soil, is necessary to sustain the plants, and to preserve them in health and vigour.

5th. Carbonaceous matter, when dissolved in water combines with oxygen and predominates in proportion; when oxygen predominates in these compounds of carbonaceous matter and water, fructification is promoted and sustained; whenever hydrogen preponderates, plants grow more to leaf and stalk and branches, than to flower, seed and fruit.

6th. The food of plants is taken up by the roots in a state of fluid, impelled upwards through the stems, and branches, and leaves, &c. and diffuse through the system; each part of the plant having the power of selecting and appropriating the portion adapted to its use, the residue, or that which is excrementitious is thrown off by the leaves.

7th. The roots of plants are gradually propelled and extended into the earth, and there they continue to collect, and absorb, and dispense an increased quantity of food; so long as it is supplied, they grow unobstructed.

8th. The quantity and quality of the food supplied to plants, affect them much in the same manner as it does animals; that is to say with a scanty supply of food they grow but little, and with a superabundant supply of food, they grow to the utmost extent of leaf, trunk and branches.

9th. The leaves form the excretory organs of the plant or tree; and whether the supply of food be great or small, a plant or tree cannot attain or sustain itself in a state of fructification, until it is furnished with a surface of leaves duly proportioned to the sap supplied by the roots. To enable them to perform these functions, also, it is necessary that the leaves should be duly exposed to the action of light, and to the influence of the sun and air.

10th. In erect growing trees and plants, in an open situation, and where the light falls equally, the sap is impelled in a vertical direction, or the inverse of the natural flow of water; that is as water flows in the greatest force through the lowest opening in a vessel or channel, the sap will flow in the greatest quantity into and through the most vertical buds that are nearest the root. And the strongest and leading branches will grow in an upright perpendicular direction; but in places where the light has a partial access only, the sap will flow, and branches bend, towards that side where the light is admitted. In creeping and climbing plants, sap flows to the extremity of the branches, whether the position be horizontal or perpendicular, and whether such branches be long or short.

11th. The destruction or loss of any part of the buds, or young branches of a tree, will not prevent the growth and extension of the roots; but these will expand, and the supply of food will continue to

be taken up by them. and appropriated to the restoration and reproduction of the leaves and branches.

12th. All trees are furnished with many more buds than they can sustain, to form fruit and branches; the position of the buds determines their office; those which occupy the most eligible situation for extending the branches, are formed for wood buds; the others form fruit-buds, or lie dormant till wanted to form fruit-buds, or to supply the casual loss of any wood buds that were above them.

13th. If a bud formed and placed for a leading branch be removed, or its position be altered, or the vessel connected with it be contracted or injured, and the usual passage of the sap be obstructed, the wood bud occupying the next best position will take its supply and perform its office. And when from any number of buds formed to receive a quantity of sap, a part be taken away, the share of sap which that part would otherwise have received, is given to those remaining, and they are extended proportionably." P. H. R.

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# PART III.

## MISCELLANEOUS INTELLIGENCE.

*Peaches.*—On the 13th of July, we were presented with some delicious Peaches by Mr. Henry Horlbeck, which grew in his garden in Charleston. The largest weighed 6 ounces, and the flavour and quality were very superior.

*Horticultural Society.*—On Wednesday the 13th of July, this Society celebrated their anniversary in Charleston, at Seyles' Hall, by a splendid exhibition of Flowers and ornamental Plants. natives and exotics—together with such Fruits and Vegetables as the season afforded. We can readily make allowances for the destructive effects of the severe winter, the chilling, protracted spring, and the excessive rains, on all the productions of our gardens, and yet the exhibition did great credit to the Society, to the Ladies and Gentlemen, who aided them with the productions of their taste, industry and care, and to the Committee of Arrangements who conducted the proceedings.

It is impossible to enumerate the curious and novel varieties of Flowers exhibited to our admiration. Among the rest. we saw a very fine *Laurus Camphora*, with elegant Dahlias in abundance, from Mr. Nicholson; *Agapanthus*, and other fine plants, from Mrs. Wagner; *Begonia Evanciana*, and others, from Mrs. Schriber; *Hybicsus Rosea*,

*Plumbago, Mispulus*, &c. from Mr. Noisettes; a Caper plant in bloom from the garden of Miss Stone. It may not be recollected that the Caper is the bud of the plant, not the fruit: this plant had been sent in the morning with one of the buds perfectly formed, which had expanded into a beautiful flower in the afternoon. Likewise, the *Myrtus Pimento, Arum Discolor, Ficus Elastica*, and others.

The *Bignonia Grandeflore*, from the garden of Mrs. Judge Johnson.

The Wedding Cake Plant, *(Xilophilla Augustifolea,)* from the garden of Mr. Michel, and a Coffee Tree, in fruit.

Splendid Flowers and Bouquets of Flowers, from the gardens of Dr. Edward North, Dr. James Moultrie, jun. Mr. D. C. Webb, Mr. Joseph A. Winthrop, Mr. Howard, Mrs. Ripley, and Mr. Naser.

The President, Nathaniel Heyward, Esq. having taken his seat in the Hall, requested Dr. Joseph Johnson, Chairman of the Standing Committee, to read the Annual Report, which was as follows:

The Committee take pleasure in congratulating the Society on the improving taste of the community for ornamental and useful gardening. A manifestation of this improvement may be seen in the several gardens springing into existence since the last Anniversary Report, and now successfully cultivated. Among these, your Committee would especially notice the gardens of Mrs. Ripley, Mr. Gonzales, Dr. Moultrie, and Mr. Bancroft. The late establishment of nurseries by Mrs. Schriber and Mr. Howard, in competition with that of Mr. Noisette, facilitates and advances our favourite pursuit, while the skill and industry of Mr. Gray and Mr. Tobin, excite a rivalry in all for profit and honour.

Your Committee have to regret that many fine Plants have probably escaped their observation, in consequence of due notice not having been received from the proprietors, while such Plants were in bloom, or from other casualties. The Horticultural Community desirous of improving this department, are requested to inform the Committee, whenever they have any thing interesting for exhibition. For the want of such information, this Report may be deficient, and the worthy proprietors be unintentionally overlooked.

For the finest, best arranged, and best cultivated Flower Garden, your Committee recommend that a premium be awarded to Mr. Thomas Bennett, not only for the taste displayed in the arrangement, but in the very many rare and valuable treasures with which it abounds. They call the attention of the Florists of this community to the Heath, *(Erica)* a class of Plants which has received but little attention hitherto in our city, and of which several varieties bloomed in his garden with great beauty. The great number of beautiful species belonging to this genus, which are cultivated in Europe, and constitute so great an addition to their conservatories, make it worthy to be introduced among us. Our climate may prove, on experiment,

more congenial to these, and many other plants than has generally been supposed. Mr. Grey, who now has charge of Mr. Bennett's garden, is a skilful and practised horticulturist, your Committee have witnessed the great success attending his efforts by the forcing system, in propagating rare Plants, and those hitherto found difficult to grow from cuttings: they consider Mr. Grey a valuable acquisition to the community.

The Dahlias of the last year, bloomed very abundantly, and in most situations continued to do so remarkably well, through the whole season, although they appeared to have been but little affected by the heat of our summer, the early and the late Flowers were decidedly larger and finer than those of midsummer. The handsomest Root-Dahlias flourished in Mr. Naser's garden, and your Committee recommend a premium to him, for the finest and greatest variety of Root-Dahlias.

A great number of our garden Flowers require to be renewed by seeds from our own and other countries, in order to have them in their fullest perfection. These are gradually diminishing under the present system of horticulture, and the Dahlias require particular attention. From the seeds of this plant, many very beautiful varieties have been produced, both in the last season and the present. Your Committee consider those in the garden of Dr. North, the finest which they saw, and recommend that a premium be accordingly awarded to him.

The Bulbous Roots did not blossom so finely this year as in former seasons, but still presented many attractions to the admirers of fine Flowers. In the garden of Mr. Nicholson, there were shown some very fine beds of Tulips, of great beauty and considerable variety, for these a premium is recommended.

In the garden of Mrs. Davis, there were a great many very fine Hyacinths, and your Committee think that a premium should be adjudged to this Lady for her successful cultivation of them. In other gardens, Hyacinths also blossomed in great variety and beauty, but those of Mrs. Davis were more uniformly fine.

In Mr. Nicholson's garden, there were two beds of Anemonies, in very great perfection, some of which were very superb; had a premium been offered for this class of Plants, it would have been adjudged to Mr. Nicholson; your Committee, therefore, recommend that the premium offered for the greatest show of any species of beautiful Flowers, be awarded him.

In the Rev. Mr. William Elliott's garden, Ranunculi flourished in the greatest profusion and succession. From thence the most beautiful display was produced, and the Society should award him a premium. Remarkably fine Flowers of this family were produced in the gardens of Messrs. Nicholson, Bennett, Lucas, and Salmon, which your Committee think deserving of great praise.

Camellias, this beautiful genus of Plants has received great attention within a few years. The severity of the two last winters destroyed the prospects which were entertained of a successful cultivation of them in the open air; and, perhaps, on account of the time at which they bloom, (very early in the spring) they never can reach their greatest perfection in an exposed situation. The very splendid large single Camellia, (a Plant more hardy than the double) is recovering from the injury it received in the last severe winter, and promises still to be an ornament to the city, in the garden of Mr. Lucas, it is the largest of which we have heard in America. There were fine displays of Double Camillias from the gardens of Mr. Michel, Mr. Bennett, Mr. Lucas, Mr. Noisette, Mr. Nicholson, Mr. Gonzales, and Mrs. Schriber. A premium is recommended to Mr. Michel for the greatest variety of Camillias, and Mr. Bennett for the finest specimens.

The garden of Mr. Bennett continues to be pre-eminent for the greatest and finest variety of Roses, and the Committee adjudge him that premium. To Mr. Michel, they recommend the premium for the finest specimen of Roses. In his garden have been introduced this year a large number of new Roses from France, which did not reach their full perfection, on account of the lateness of their arrival. This garden also contained a great number of Moss Roses, propagated by the indefatigable proprietor himself. It is impossible in this Report to notice all the gardens in which the Queen of Flowers was successfully cultivated.

Mrs. Schriber had the finest Carnations which your Committee saw, and they recommend that the premium be awarded to her.

A premium should be awarded to Mr. James Legare for his *Rhododendron*—the most beautiful indigenous flowering Plant. There were many fine native Plants, to which the attention of the Committee was called. The *Elliottia Racimosa* in Mr. Bachman's garden—the *Sedum Ternatum*, in that of Dr. Horlbeck—the *Azalia Calendulacea*, at Mr. Noisette's, may also be mentioned with approbation. To Mr. Noisette, is adjudged a premium for the introduction of a new species of flowering Exotics—the *Pittesporum Variegatum*. The Committee remarked the beautiful *Metrosedoros* in Mr. Gonzales' garden, where it flourished through the past winter, and blossomed in the spring—they recommend a premium to him for this, the most beautiful new flowering Exotic.

In the premiums offered for Vegetables and Fruits, the Society have been desirous of increasing the quantity as well as the quality of these productions; of improving the Charleston market, in these delightful varieties of wholesome food, and of promoting an increased relish and consumption of Vegetables, compared with animal substances. This object of the Society will account for the numerous very fine produc-

tions of private gardens, not having received the premiums offered, the quantities were either too small, or the articles were not offered in the market. This circumstance will account for the slight notice taken of the very fine specimens of Artichokes presented by Mrs. H. P. Rutledge, Mr. William Mazyck and Mr. James Bancroft—the Cauliflowers by Mr. John Stoney, the Sea Kale, by Mr. Bennett, and other things of the kind by different persons, for whose attentions, the Society is greatly indebted.

The following Premiums were awarded.

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| To Mr. Tobin, | for the best | Cauliflower, | a Silver Medal. |
| " Do. | " | Brocoli, | do. |
| " Mr. D. C. Webb, | " | Leeks, | do. |
| " Mr. James Legare, | " | Parsnips, | do. |
| " Mr. E. W. Bounetheau, | | Silver Onions, | do. |
| " Do. | " | Madeira do. | do. |
| " Do. | " | Salsafy, | do. |
| " Mr. Joseph O'Hear, | " | Early Potatoes, | do. |
| " Mr. John Michel, | " | Artichokes, | do. |

" Mr. Justus Hartman, for the greatest variety of fine Vegetables produced on any one Farm or Garden, a Silver Medal.

" Mr. Joseph A. Winthrop, for introducing the cultivation of two fine varieties of Squashes—the California and Cocoanut Squashes, a Silver Medal.

The seasons having been unfavourable, fewer specimens of fine Fruits have been exhibited to your Committee than in previous years. Among those most worthy of notice were the following. The Claret Grapes from the garden of Mrs. William Clarkson, were remarkable for the size of the bunches, being perfect, fully matured, and of fine flavour. From Mr. F. Petit's garden, Grapes of a small size, but equally full and perfect bunches, fully matured and excellent in flavour, were submitted to your Committee, which, in their opinion, were native Grapes improved by cultivation. These two varieties being the finest of their respective kinds, are deemed worthy of premiums. Three fine varieties of Grapes were inspected in the garden of Mr. Fausbender; Mr. Parkinson also presented several bunches, considered very fine, particularly in flavour.

Fine Peaches and Plums were seen in the garden of Dr. Boylston, the latter were very large, and the finest that had been exhibited to the Society; the Peaches were also excellent.

Strawberries of remarkable size and excellence have been exhibited to the Society by several. Some which measured 5⅜ inches in their greatest circumference, and weighed 259 grains, called the "King's Seedlings," were exhibited at the public meeting in May, and grew in the garden of Mr. Jonathan Lucas. Some Strawberries also from the gardens of Mrs. Ripley, Mr. John Michel, and Mr. Lionel H. Kennedy, were also very fine. From the garden of the latter were also exhibited the Red Antwerp and Black Raspberry, in great per-

fection and abundance. A new variety of *Rubus*, (called the White Blackberry) was recently exhibited, having been cultivated in the garden of Mr. Gyles, and considered of a delicate flavour.

Some of your Committee visited the fine orchard of Col. Simon Magwood, in St. Andrew's Parish, and saw many varieties of Pears, among which is the Seckel Pear; the Brown Buré, were in the greatest perfection, and most numerous.

Specimens of Apples from the orchard of Woodstock, in St. James', Goosecreek, were also exhibited and considered very fine.

The following Premiums are accordingly recommended:—

To Mrs. William Clarkson, for the finest Grapes, a Silver Medal.
" Mr. F. Petit, for the finest native cultivated do. do.
" Dr. Henry Boylston, for the finest Plums, do.
" Mr. Jonathan Lucas, for the finest Strawberries, do.
" Mr. John Michel, for the largest quantity of fine do. do.
" The Proprietors of Woodstock, for the largest Piece of Ground well cultivated in Strawberries, a Silver Medal.
" Col. Simon Magwood, for the greatest variety of fine Pears, a Silver Medal.
" L. H. Kennedy, for the greatest quantity of fine Antwerp Raspberries, a Silver Medal.

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*Gama Grass* (Tripsacum dactyloides.)—We observe that this grass, which, *en passant*, has really been *fodder* for a long time for the editors of our numerous agricultural and horticultural periodicals, has at last reached England, where, Loudon, in the last number of his Magazine, recommends it for a trial. He, however, is quite pardonable for so doing, as he has doubtless drawn his information regarding it from the American accounts. Nothing can be more nonsensical than the praises lavished upon this grass, in our papers of the last two or three years, as a crop for culture in the Northern States, as all intelligent cultivators who have tested it themselves are now fully aware. The *gama grass*, in the Southern States, under a burning sun, and in situations where the common pasture grasses of the cooler States would perish in a month, yields abundant crops of coarse herbage, and is really a plant of the greatest utility; but to endeavour to cultivate it in the Northern States, where the finest and most nourishing grasses are indigenous or perfectly naturalized, is something like exchanging for dry cornstalks the first verdant growth of red clover. It will be still more amusing and ridiculous in England, where the moist climate and mild summers contribute to the production of the closest and finest turf, and most tender and succulent herbage for cattle, to be found in the world.—*A. J. D., Botanic Garden and Nursery, Newburg, N. Y. June*, 1816.

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*Beet Root Sugar.*—At the recent meeting of the German Naturalists, at Bonn, the section of agriculture and rural economy was almost entirely occupied with papers and discussions on this subject. At Valenciennes, a manufacturer has succeeded in discovering a method of chrystalizing the whole of the saccharine matter of the beet, without producing molasses in the process.—*Lond. Mag. Pop. Sc.*

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*Hint to Dyers.*—A practical dyer of Troyes, in France, asserts that the acetate of iron is much preferable to the sulphate, in dying blacks. That stuffs which are injured by washing in caustic leys, or even soap, may be cleansed by rubbing in a weak starch bath.—*Bulletin Soc. d'Encouragement, &c.*

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*Hint to Bleachers.*—The same individual states that muriatic acid, used instead of sulphuric, in decomposing bleaching salts, does not render woolen goods harsh, as is often the result of the common acid bath.—*Ibid.*

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*Action of Salt Water on Cast-iron.*—Sea water so alters the nature of cast-iron, that its cohesion appears to be quite destroyed. Cannon which have been

fished up, after lying long in the sea, have been found converted, through their substance, into something resembling plumbago, and admitting of being cut with a knife.—*Mining Jour. Naut. Mag.*

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*Mineral Pitch Lake of Trinidad.*—This extraordinary body of mineral pitch is about half a mile in length, and a sixteenth of a mile in breadth. Numerous pools of water exist on its surface. The mineral is hard enough to bear the weight of a man of common size, unless when heated by the sun. It is unlike vegetable pitch, being allied to coal. It is used by the inhabitants of Trinidad for making roads, and cementing stones under water. Gas has been made from it.—*Jameson's Journal, from Webster's Voyage.*

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*Culture of Silk in Cuba.*—The government of Cuba are making an effort to introduce the culture of silk in that Island, with a fair promise of success. Being situated between 20 and 23 and a half degrees of north latitude, the mulberry will be constantly in foliage, and a regular succession of crops may be made during the whole year. The same is true with respect to some portions of Florida, where experiments are making with favourable prospects.

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*The Silk Culture,* in New-Jersey, is about to be entered upon with great spirit and enterprize. A Silk Company with a capital of $200,000 has just commenced operations by a subscription to the whole amount of shares, (4000,) in a few hours. They are making preparations to purchase a suitable tract of land to cultivate the Chinese mulberry.

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*Sheep.*—A correspondent has furnished us with the following receipt, which he says he knows, from repeated experiments, to be "good for making strong wool and healthy sheep." It is easy, cheap, and well worthy of trial.

"When the sheep is shorn, dip a cloth in soft soap and rub the sheep all over—then dip the cloth in warm water and give the sheep a complete lather, and let it go.—*Ten. Far.*

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*It is very important* that many kinds of seeds should be rolled in by a heavy roller, or by pressing the earth down hard upon them by placing a board on the bed, and walking across it several times. Celery, spinach, onions, and many other kinds of garden seeds, will not vegetate unless the earth is pressed on them hard, or rolled after being sown.—*Maine Farmer.*

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*Cattle should have salt twice a week;* or the better method is to put salt where they can get it when they please; this method is recommended by many intelligent farmers who have long practised it. A small quantity of salt petre mixed with salt is very beneficial to cattle.

Unleached ashes mixed with salt, in the proportion of eight quarts of ashes to one of salt, is said to be conducive to the health of cattle, horses, and sheep; it increases their appetite, prevents botts in horses and rot in sheep. This is doubtless useful in hot weather, as alkalies are of a cooling nature, and tend to reduce the stimulating powers of the blood.

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*A French* scientific journal certifies to the efficacy of common salt in fixing white wash made of lime. The water in which the lime is slacked, should be first saturated with salt.

The white wash thus produced is permanent. It does not crack, nor come off upon one's hand or clothes.

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*It is a fact* spoken of as not a little remarkable, that in America, there are a hundred and twenty different species of forest trees, whereas in the same latitude in Europe, only thirty-four are to be found.

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*Queen Cakes.*—Take a pound of sugar, beat and sift it, a pound of well dried flour, a pound of butter, eight eggs, and a half pound of currants, washed and picked; grate a nutmeg and an equal quantity of mace and cinnamon, work the butter to a cream, put in the sugar, beat the white of the eggs 20 minutes, and mix them with the butter and sugar. Then beat the yolks for half an hour and put them in the butter. Beat the whole together, and when it is ready for the oven, put in the flour, spices, and currants; sift a little sugar over them, and bake them in tins.—*Far. and Mechanic.*